DOCUMENT RESUME

ED 037 593 AA 000 526

TITLE	An Analysis of Instructional Expenditures for Institutions of Higher Education in the Northeast United States.
INSTITUTION	State Univ. of New York, Buffalo.
SPONS AGENCY	Program Planning and Evaluation, OAC.
PUB DATE	May 70
NOTE	258p.
EDRS PRICE	EDRS Price MF-$1.00 HC-$13.00
DESCRIPTORS	Cost Effectiveness, *Educational Administration, *Educational Finance, Expenditure Per Student, *Facility Utilization Research, *Higher Education, *Operating Expenses, Resource Allocations

ABSTRACT

In the past decade institutions have been troubled with problems of increasing enrollment and increasing expenditures. This study proposes to identify common cost patterns as a guideline in determining approach to full utilization of resources. This research will assist government policy makers to identify institutional educational resource requirements in order that they may promote and affect legislation to assist public and private institutions of higher education. The study concentrates on 362 institutions in the Northeast United States for the Fiscal Year 1964, supplemented by data from 1962 and 1967. For analysis, the institutions are stratified by type, control and the selectivity level of student. Variations in educational operating expenses are reviewed in light of changes in the enrollment mix, staffing and physical plant. Certain implications for higher education institutions have evolved from the study. Two of the more important are: 1. The productivity of the individual faculty member needs to be increased without increasing class size and capital cost. 2. There appears to be sufficient evidence to indicate that no institution should enroll less than 1000 students. Implications for government are: 1. Aid to post-secondary institutions needs to consider the variations in educational operating costs and yearly plant costs. 2. Given plant space additional students could be accommodated in private institutions at less cost. (ON)

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AN ANALYSIS OF INSTRUCTIONAL EXPENDITURES FOR INSTITUTIONS OF HIGHER EDUCATION IN THE NORTHEAST UNITED STATES

In the past decade, institutions have been troubled with problems of increasing enrollment and increasing expenditures.

The purpose of this study is to identify common cost patterns, possibly for the use of college administrators, as a guideline in determining an approach to full utilization of resources. Additionally, to assist government policy-makers in identifying institutional educational resource requirements in order that they may promote and affect legislation to assist public and private institutions of higher education.

The study concentrates on 362 institutions in the Northeast United States for the Fiscal Year 1964, supplemented by data from 1962 and 1967.

For analysis, the institutions were stratified by type, control and the selectivity level of student. Variations in educational operating expenses were reviewed in light of changes in the enrollment mix, staffing and physical plant.

The more significant findings include:

1. Institutions at higher levels of the Cass and Birnbaum selectivity factor, have greater amounts of educational resources available to students. For example: the student-to-faculty ratio, which singly accounts for more of the variance in educational operating costs than any other staffing factor, is from 50 to 100 percent lower in

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the more selective institutions. Conversely, students in the less selective institutions paid more to attend college, particularly in those institutions under private control.

2. From Fiscal 1964 to 1967, the demand for the most selective, and the shortage of resources in all institutions, was so great that all students were willing to pay a larger share of their educational operating costs.

3. In all private two-year and four-year institutions, a definite downward trend was observed in educational operating costs per student as enrollment increased, to the 1000 to 1500 interval.

4. In most instances, a consistent share of current expenditures are spent on the education function, reflecting similarity in the goals of institutions by class.

5. In the less selective institutions, net tuition is determined by, and determines to a great extent, the amount of funds available for educational resources.

6. As enrollment rises, the percentage of educational operating costs required for plant and library operations decreases, regardless of the absolute dollar value of operating costs. The percentage of educational operating costs per student allocated for administrative costs depends on the dollar value of educational operating costs per student; the higher the value, the greater the relative share. Relative instructional costs move in the opposite direction of administrative costs over increasing enrollment levels.

7. Physical plant appear to be utilized in a consistent and efficient manner in all classes, with the exception of religiously-controlled liberal arts and private junior colleges. It is theorized that excess space in these institutions is due to a shortage of institutional funds to subsidize educational operations rather than an inefficient use of plant.

As a result of the findings, certain implications for institutions have evolved. Two of the more important are:

1. The productivity of the individual faculty member needs to be increased without increasing class size and capital costs. One such method is to recognize differences in students' rates of learning and to restructure the traditional school year.

2. There is sufficient evidence to indicate that no institution should enroll less than 1000 students.

Implications for government are:

1. Aid to post-secondary institutions needs to consider the variation in educational operating costs as well as yearly plant costs.

2. With a proper student aid program, a substantial number of additional students could be accomodated in the private sector at less cost than public institutions, given the availability of plant space.

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AN ANALYSIS OF INSTRUCTIONAL EXPENDITURES FOR INSTITUTIONS OF HIGHER EDUCATION IN THE NORTHEAST UNITED STATES

By

Salvatore Corrallo

May 1970

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PREFACE

Recently, economists have turned their attention to relating some of the economic concepts of the industrial firm to the higher education firm. Most of their work has been hampered by limited and or inconsistent data. Econometric type models for the institution have been developed by the University of California, the University of Toronto, Ohio State, and Michigan State University. However, they are unique to those particular institutions. Even the cost patterns for institutions in State, public higher education systems, which distribute funds on a formula basis, may not be compatible because of differences in class size, age of buildings, location, and degree of resource utilization.

On September 1, 1967, I began what was to become a two-year fellowship in the Office of Program Planning and Evaluation, U.S. Office of Education, Washington, D.C. The director of the office, Dr. Joseph Froomkin assigned me to study cost patterns in higher education for the United States, using information and resources available in the U.S. Office of Education. The results of the national study made it very clear that the scope of work was not comprehensive enough. At this point, after considering the necessity for more comprehensive institutional data, both in descriptive and analytical form, I decided to undertake a study, restricting the location of the institution to a single region but including a greater number of variables. The nine-

State Northeastern United States was selected because it has strong systems of both public and private higher education.

As I see it, the present goal of economists and financial analysts should be to identify and explain, where possible, commonality in patterns of resource allocations to institutions to institutions of higher education. That is the prime purpose of this study. It should be evaluated by keeping in mind that this is a necessary first step in establishing the direction of future economic-oriented studies. Special attention is given to the problem of identifying levels of enrollment which are less costly, given equal resources, in an economic sense.

Although no direct financial grant was made for the study, it was supported entirely by the Office of Program Planning of the U.S. Office of Education. In addition to Dr. Froomkin, under whose sponsorship this work was made possible, two other members of the Office are deserving of special recognition: Mr. Murray Spitzer, without whom the computer programs could not have been written, and Miss Priscilla Dever, for her special assistance in the total report. Other members of the Office of Program Planning who deserve mention include Mr. Harry Piccariello, Mrs. Cora Beebe, Mr. Michael Burstein, Mr. Murray Pfeferman, Mr. Bert Mogin, Mr. Richard O'Brien, Mr. Carl Wisler, Mr. Howard Vincent, Mr. William Combs, Dr. George Mayeske, Mr. Murray Blum, and Dr. Dennis Dugan, Brookings Fellow on leave from the University of Notre Dame.

Mrs. Eulean Hollis, Mrs. Patsy Sharp, Miss Yvonne Curry and Mrs. Lorraine Voellinger contributed invaluable secretarial assistance. Gratitude is also expressed to Miss Louise Ellis and Mr. Paul Mertins of the National Center for Educational Statistics for making the data files available.

This paper was submitted and accepted in April 1970 as a dissertation at the State University of New York at Buffalo. To this end the assistance of Dr. G. Lester Anderson now of Pennsylvania State University and Dr. Mertin Ertell of the State University of New York is gratefully acknowledged.

The paper in no way is an official statement of the policy or opinion of the U.S. Office of Education or the U.S. Government but is merely a report on research done in and out of the Office of Program Planning and Evaluation by the author.

It is being distributed on a limited basis in hope that it may be helpful to higher education planners, researchers, and administrators.

Salvatore B. Corrallo

May 1970

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CHAPTER I

INTRODUCTION

> Almost all of the resources used in education are measurable in physical units and their monetary equivalents. Since these resources are far from unlimited, it certainly makes sense to think about their efficient use in achieving the measurable benefits of education, as long as the measurements are not taken too seriously and the unmeasurable benefits are not forgotten.[1]

With this admonition of Alice Rivlin in mind, the general purpose of this study will be:

(1) To identify homogeneity or commonality in cost patterns for institutions of higher education.

(2) To explain, where possible, the factors associated with heterogeneity or differences in these cost patterns by considering selected financial, staffing, and enrollment items.

The Institution of Higher Education, Its Functions and Outputs

When defining the output of an institution of higher education, it becomes necessary to understand its functions, and, to

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[1] Mushkin, Selma, Ed., Economics of Higher Education (U.S. Office of Education, Government Printing Office, Washington, D.C., 1962) p. 360.

some extent, its organization. In a sense, an educational institution is analogous with an "impressario" in that it gathers and organizes resources, faculty, staff, and plant facilities, in the expectation of being able to offer the community a number of services, those services taking the form of instruction, research, and public service.[1]

The product of the instructional function is an educational experience. It is offered to those willing and able to take advantage of the opportunity. However, no guarantee is made that each will benefit equally, if at all, from the experience. Hopefully, the educational experience will be positive and the institution's services will continue to be in demand. For those institutions which gather and coordinate resources most effectively, or in a unique manner, the demand may be so great that admission is necessarily restricted or rationed on a non-price basis.

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[1]Classifying the output of an institution of higher education by using three functions is widely accepted. See in particular:

a. M. G. Keeney, H. E. Koenig, and R. Zemach, A Systems Approach to Higher Education, Final Report Project C-396 (National Science Foundation, Washington, D.C.) March 27, 1967, p. 10.

b. George W. Baughman, "Evaluating the Performance and Effectiveness of University Management Systems," paper presented at a seminar, Information Systems and Analytical Models in the Administration of Higher Education, (Sterling Institute, Washington, D.C.) April 24-26, 1969.

c. Lawrence Southwick, Jr. The Economics of Higher Education: The University as a Firm (Dissertation, Carnegie Institute of Technology, Pittsburgh, Pa.) 1967, p. 70.

Correa[1] and Becker[2], along with others, have demonstrated that the higher the educational level achieved, the greater the return to the community in the form of long-term economic growth. These gains are, in essence, an indirect reflection of the output of the instructional function. Organized research and public service operations of institutions of higher education offer more immediate and direct benefits to the community. They provide new technology, applied research, extension and medical schools, as well as adult and remedial education programs. Although the organized research and public service functions can, and do in some instances, operate independently of the instructional function, there are frequent interrelationships between inputs.

It must be recognized that the institution of higher learning does not exist in the absence of the instruction function since it is the raison d'etre. Institutions do function adequately in the absence of the other two functions.

This study will concern itself primarily with the instructional function. This approach is not unique since as early as fourteen years ago the California and Western Conference Cost and Statistical Study envisioned the institution of higher learning as

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[1]Hector Correa, The Economics of Human Resources, (Amsterdam, Holland: North Holland Publishing Co., 1963)

[2]Gary S. Becker, Human Capital: A Theoretical and Empirical Analysis (New York: Columbia University Press, 1964).

primarily an environment for learning.[1] Furthermore, approximately 70 percent of all expenditures of institutions is in support of the instructional function.[2]

Measures of Institutional Outputs

Most methods used in the past to measure institutional outputs are a function of purpose and/or the availability of data. They include:

(1) Student scholastic achievement scores such as class standing and grade point averages, and standardized tests such as the graduate record examination.

(2) Student vocational achievement measures such as the wages of graduates and number of students entering graduate schools.

(3) Personal adjustment indices on attitude and sociability as well as extra-curricular activities.

(4) Number of graduates by academic discipline and/or by level of degree.

(5) Number of students enrolled, full or part time, according to sex, and the degree level.

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[1]Fund for the Advancement of Education, California and Western Conference Cost and Statistical Study for the Year 1954-55 (University of California Printing Dept., Berkeley, California, 1956.)

[2]U.S. Department of Health, Education, and Welfare, Office of Education, Digest of Educational Statistics, (Washington, D.C., U.S. Government Printing Office, 1967) p. 93.

(6) The rate of student attrition, transfer, and completion of study in four years.

It has already been established, for use in this paper, that the output of the instructional function is an educational experience, then logically the number of students in each class times (x) the number of credits for which the class is given would be a valid output measure. James Doi who, with John Dale Russell, is considered a pioneer in applying cost analysis to colleges and universities, calls this measure "student credit hours." He feels that it is the "best single statistical measure (in quantitative terms) for describing the output or the production of the instructional program."[1]

Adjustment for the amount of instruction received by all students, full and part time, at all levels, graduate and undergraduate, is achieved by using student credit hours. There is no need for a universal definition of the number of semester credit hours which constitute a full-time student when inter-institutional comparisons of output are necessary.

It is also suggested that instructional output is best measured by the number of students an institution graduates; the contention is that consideration of all degree programs, Associate,

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[1]James I. Doi, "The Analysis of Class Size, Teaching Load, and Instructional Salary Cost," College Self Study, Boulder, Colorado, Western Interstate Commission on Higher Education, 1959, p. 192.

Baccalaureate, Masters, and Doctorate will accurately project the true cost of instruction. This measure is inadequate in that it excludes non-matriculating, part-time, and/or dropout students whose number varies from one institution to another, depending on admission policy, location and the socio-economic status of the student body.

It has already been demonstrated that graduate education is more expensive on a per-student basis than undergraduate education.[1,2] A prime reason for the cost differentiation is class size.[3] When using student credit hours as a measure of output, adjustment for the level of student is implicit and class size is automatically taken into consideration. The measure of student credit hours is the answer to these deficiencies. Unfortunately, student credit hours for institutions of higher education are not readily available. Consequently, it will be necessary to find a substitute which is available on a cross section basis, is consistent over time, and has a high reliability factor.

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[1]Allan Cartter, An Assessment of Quality in Graduate Education (Washington, D.C., American Council on Education, 1966)

[2]Paul Mertins and Thomas Cowell, Student Credit Hours and Direct Costs in the Schools and Colleges, Fall Term, 1965 (Ann Arbor, Office of Institutional Research, University of Michigan, 1966)

[3]Carl W. Borgmann and John W. Bartram, Mineral Engineering Education in the West (Boulder, Colorado, Western Inter-State Commission for Higher Education, July, 1969) p. 39.

Of the 362 Northeastern institutions of higher education included in the study, 162 had submitted an application for funds under Title VI of the Higher Education Act of 1965. Included in the application was the number of student credit hours that the institution granted for Fiscal Year 1967. At the same time, the National Center for Educational Statistics developed a full-time equivalent student formula. It is derived by adding one-third of the Fall part-time enrollment to the Fall full-time enrollment. Since the latter set of institutional data are readily available, I endeavoured to determine the relationship between the Fall full-time equivalent enrollment and student credit hours produced in a fiscal year, with the possibility of using it as a substitute measure for instructional output.

Analysis indicated (Table 1-1) that Fall full-time equivalent enrollment is strongly related to total student credit hours produced in a fiscal year for all types of institutions. Further, the Student's "t" Test indicates that the sample is highly reliable.

The data for junior colleges include an adjustment (one-sixth) for summer school enrollment. It was the only group for which summer school figures were available; however, the results were comparable.

On the basis of this analysis, it appears safe to accept Fall full-time equivalent enrollment as a substitute measure of educational output (in quantitative terms) of colleges and universities, as defined in this study. Yet, identifying an appropriate

TABLE 1-1

A COMPARISON OF STUDENT CREDIT HOURS AND FALL FULL-TIME EQUIVALENT ENROLLMENT[a] FOR SELECTED NORTHEASTERN INSTITUTIONS OF HIGHER EDUCATION, 1966-67 BY TYPE AND CONTROL

Type	Number of Institutions	Sample Size	R[b]	Student's "t"
University	37	21	.966	16.2
Liberal Arts	189	60	.993	75.7
Teacher College	53	29	.949	15.7
Tech. and Prof. College	56	18	.975	17.3
Junior College[c]	146	34	.985	33.0
All Institutions	481	162	.985	73.0

Sources: (1) 1966-67 Title VI - Higher Education Act of 1965 Application Form.
(2) Department of Health, Education, and Welfare, Office of Education, Fall 1965 Enrollment of Institutions of Higher Education. Government Printing Office, Washington, D.C., 1966.
(3) American Association of Junior Colleges, 1967 Junior College Directory, Washington, D.C. 20036.

[a]Fall full-time equivalent enrollment is equal to one-third of the Fall part-time enrollment and all of the full-time enrollment for the same period.

[b]R = Correlation Coefficient

[c]Includes one-sixth summer term enrollment from 1967 Junior College Directory.

quantitative measure of instructional output, without consideration of the qualitative or differentiating factor, is unacceptable.

The Compatibility of Institutional Outputs

To distinguish qualitatively among instructional outputs is a desirable prerequisite for analysis. That is, if quality of instruction is held constant, then differences in cost may denote differences in the effectiveness of an institution's operations.

Prerequisite Adjustments for Institutional Outputs

One method of differentiating institutional output is to measure the degree of change in a student's personality or achievement level. Recent research, however, has suggested that institutions in themselves may contribute very little to the change in the level of the measure of a student's performance. Astin and Panos, for example, state:

> In a special analysis of educational achievement as measured by student performance on the Area Tests of the Graduate Record Examination, it was found that deviations in student achievement were almost completely a function of differences in student characteristics that existed prior to matriculation; the contribution to student achievement of measures of the college environment--including traditional measures of institutional quality of "excellence"--was essentially trivial.[1]

The same conclusions were reported in a recent study of 95 colleges by the Educational Testing Service when they used mean institutional

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[1]Alexander W. Astin and Robert J. Panos. The Educational and Vocational Development of American College Students (Washington, D.C., American Council on Education, Preliminary Report, February, 1968) p. 9.

rather than student values.[1] Furthermore, Skager, Holland, and Braskamp report that research in higher education had eliminated college experience as an independent variable in personality change of students.

They report:

> Until other explanations can be found, changes of traits such as open-mindedness or flexibility presumably must be attributed to maturation within the broader cultural-temporal context rather than to experience associated with attending college.[2]

In another vein, Pace reports that students do not attend a given institution by chance.

> That there is some kind of selective distribution between students and colleges . . . is a fact. There are selective students as well as selective institutions and the number of both has increased in the recent past. For the present, selective distribution is better described as a phenomenon than a system, a loosely individualistic and informal process than a National Program, a competition among possible choices than a matching of particular students to particular colleges.[3]

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[1]Donald A. Rock, John A. Centra, and Robert L. Linn, The Identification and Evaluation of College Effects on Student Achievement. (Educational Testing Service, January, 1969)

[2]Rodney Skager, John L. Holland, and Larry A. Braskamp, "Changes in Self-Rating and Life Goals Among Students at Colleges with Different Characteristics," ACT Research Reports, No. 14 (Iowa City, Iowa 52240, Research and Development Division, August 1966)

[3]Robert C. Pace, "Selective Higher Education for Diverse Students" Universal Higher Education, Ed. by Earl J. McGroth (New York: McGraw-Hill Book Company, 1966) p. 160.

Why the concern over the selection process? Astin and Panos explain:

> Using the institution as the unit of analysis in the control of differential student inputs provides a very conservative test of enrivonmental influence, since this particular method is likely to partial out the effects of most environmental variables that depend on characteristics of the student body that are selectively recruited into the various institutions.[1]

It would seem that a serious methodological problem exists; i.e., institutional environments differ primarily because of the students, but adjusting for differences in student ability nullifies the effect of the most important variable. Yet, it is probable that institutional variables differ to such an extent that some reclassification of institutions will be necessary. Pace's work may offer a solution. He applied the College and University Enrivonmental Scale (CUES) to institutions and found that it was possible to distinguish among institutions of higher education by using the traditional administrative breakdowns of type and control and by considering the selectivity level of students. For selectivity level of students he used a minimum 350 score on the Scholastic Aptitude Test. Those institutions with less than that amount were considered more open, or less selective, than the others. His grouping follows:

1. Very selective non-sectarian liberal arts colleges.
2. Academically selective universities.

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[1]Astin and Panos, op. cit., p. 44.

3. More open universities and teachers colleges.

4. More open liberal arts colleges.

Astin and Panos, somewhat in support of Pace, found that students were very much affected by other students within the school, especially those in certain professional programs who tended to become more determined to obtain their degree.[1]

In the same study, the geographic location or region was also found to affect the students' vocational goals. In the Northeast region, for example, enrollees were more likely to complete their degree program, attend graduate school, and increase their interest in the arts, humanities, and social sciences. Regional differences in tuition and fees are also noted in a study by the Life Insurance Agency Management Association.[2] Finally, an American College Testing Study noted regional differences in junior colleges, by using an instrument they developed which contained 36 characteristics in the environment.[3]

The traditional administrative categories of type and control refer in a sense to the institution's level of instruction.

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[1] Ibid., p. 20.

[2] Life Insurance Agency Management Association, College Cost Trends 1957-1963 (Hartford, Connecticut, 1964).

[3] J. M. Richards, L. P. Rand, and L. M. Rand, Regional Differences in Junior Colleges, Act Research Reports No. 9 (Iowa City, Iowa 52240, Research and Development Division, December, 1965).

A two-year institution is one which grants an associate degree and lower; and a university grants a doctor's degree or equivalent and lower. Control refers to the governing or sponsoring body. A public institution is one controlled by a Federal, State, or local agency; a private-religious institution is controlled or sponsored by a religious order; while a private non-sectarian institution is one incorporated as an independent entity. For this study, there are seven groups or classes of institutions categorized in this way (See Table 1-2). (Liberal arts colleges will be categorized as four-year colleges.)

Output, then, is represented by the full-time equivalent degree credit enrollment (FTEE), but institutional outputs need to be differentiated by the type and control of the institution, region, and the selectivity level of students. The next section will define the selectivity factor to be used.

The Selectivity Level of Students

For this study, the selectivity level of students will be identified through the use of a selectivity index as developed by James Cass and Max Birnbaum.[1] It is a measure of the scholastic potential of the student body, based on the percentage of applicants accepted by the college, the average test scores of recent high school classes, the ranking of recent freshmen in their high

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[1]James Cass and Max Birnbaum, Comparative Guide to American Colleges (New York: Harper and Row, 1966).

TABLE 1-2

TOTAL NUMBER OF INSTITUTIONS OF HIGHER EDUCATION LOCATED IN NORTHEAST REGION BY TYPE AND CONTROL AND FULL-TIME EQUIVALENT ENROLLMENT 1963-4 COMPARED TO NUMBER USED IN THIS STUDY

Institution	No. in Northeast	No. in Study	% of Total
Universities - Public[a]	10	10	100.0
Universities - Private[a]	28	28	100.0
Liberal Arts - Private[b]	178	168	94.4
Four-Year - Public[c]	60	58	96.7
Junior Colleges - Public[d]	42	37	88.1
Junior Colleges - Private[d]	71	61	85.9
Total[e]	388	362	93.4
Total FTE Students	799,909	749,670	93.7

Institutions classified as:

[a]Universities are those which grant a Ph.D. or equivalent degree and lower.

[b]Includes sectarian and non-sectarian institutions. Sample will consider 103 sectarian and 65 non-sectarian controlled schools, all classified as private four-year colleges.

[c]Includes liberal arts and teacher colleges.

[d]Includes technical institutions

[e]Several categories of institutions were excluded: theological schools, professional schools, and technical schools, primarily for their intense specialization and/or their dissimilarity. Listed under professional schools, for example, are medical colleges, music schools, and business colleges, making meaningful intra-group analyses highly questionable.

school classes, and other related data, and is available in published form. It categorizes colleges as "selective," "very selective," "highly selective," or "among the most selective." Following is the numerical rank which has been assigned to each category.

Most Selective	1
Highly Selective	2
Very Selective	3
Selective	4
Not listed	5

The Cass and Birnbaum index was selected primarily because it ranks institutions on a rather broad scale. It also uses two of the more reliable indicators of past and potential student achievement: high school rank and the average academic ability of entering students. Classification of institutions based solely on the average academic ability of students has been used by Astin in his recent work.[1] It can be illustrated that there is a strong relationship between the indicators, with the result that they compliment one another.[2]

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[1]Alexander W. Astin, Undergraduate Achievement and Institutional "Excellence," Science, Volume 161, 16 August, 1968, pp. 661-668.

[2]College Entrance Examination Board, Manual of Freshmen Class Profiles, (New York, New York 1965-67) p. xii.

In addition to selectivity, there will be some adjustment for what will be referred to as the enrollment mix.

The Enrollment Mix

There is sufficient evidence to suggest that instructional output must be adjusted for the enrollment mix. In the first place, as was noted previously, adjustment for the type and control of an institution implicitly adjusts for the level of instruction between institutions. For the same reason, adjustment for graduate and undergraduate students enrolled within each institution is required. Secondly, the enrollment mix, i.e., the distribution of graduate and undergraduate, male and female, full- and part-time students, may influence costs. For example, an institution has fixed costs built into its operating budget. Portions of its current operating costs as well as yearly cost of physical plant will be incurred regardless of the size of its student body. Should an institution wish to add part-time students in an evening program, income from the part-time students need only cover the operating costs for the part-time programs since fixed costs remain essentially unchanged. Additionally, a University of Michigan study indicated that instructional costs per student differed between graduates and undergraduates by approximately three to one.[1] This

[1] Paul F. Mertins and Thomas D. Cowell, Student Credit Hours and Direct Costs in the Schools and Colleges; Fall Term 1965-66 (Ann Arbor, Michigan, The Office of Institutional Research, University of Michigan).

same ratio was used by Cartter in his work on graduate education.[1]

Lastly, the types of programs that women traditionally select in greatest numbers[2] are presumed to be less costly ones, such as education and the social sciences. Expenditures per student may therefore be significantly influenced by the male-female mix.

Comments on Financial and Staff Resources

In addition to making adjustments for differentiation of institutional outputs, there are other issues which need to be discussed before the scope, direction, and organization of the work is finalized. These include comments on educational operating expenditures, faculty and other professional staff, operating revenue, academic plant, least cost levels for ranges of enrollment, and adjustment for price changes.

Educational Operating Costs

Educational operating expenditures are those costs which can be allocated to the instructional function. In this study,

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[1]Allan Cartter, An Assessment of Quality in Graduate Education (Washington, D.C., American Council on Education, 1966)

[2]U.S. Department of Health, Education, and Welfare, Office of Education, Digest of Educational Statistics, 1968, (Washington, D.C., U.S. Government Printing Office) p. 87.

educational operating costs encompass four components: administration, instruction and departmental research, library, and physical plant costs. While some consideration to the yearly cost of physical plant will be given in Chapter 5, all references to educational operating costs will include only these four budget items.

Faculty and Other Professional Staff

Full-time equivalent enrollment was designated as the measure of output in this study; however, as was demonstrated, it is necessary to adjust for differentiation of output by considering other variables. So, too, will it be necessary to consider the differentiation of the instructional staff by considering the ratios of students to faculty, the decile ranking by institution of the number of Ph.D.'s on the faculty, and the full-time to total faculty ratio.

The importance of making these adjustments is obvious when it is noted that instructional costs, which include faculty wages, account for about 55 percent of educational operating costs in private institutions and about 64 percent of the educational operating costs in public schools.[1]

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[1]The percentages were calculated from data found in the following publication:

U.S. Department of Health, Education, and Welfare, Office of Education, Higher Education Finances: Selected Trend and Summary Data (Washington, D.C., Government Printing Office, 1968) pp. 62-85.

When all professional wages included in educational operating expenditures are calculated, it is discovered that they account for about 77.5 percent of the total. Therefore in addition to the above ratios the student-to-administrator and student-to-student personnel staff ratios will assist in explaining variations in educational operating expenditures.

Operating Revenue

There are two categories of income important to this work: the amount students contribute to their educational costs, or net tuition, and the amount contributed to the students' educational cost by other sources, or the educational operating subsidy. The analysis of net tuition and educational operating subsidy may indicate whether, as Bowen suggests, tuition is used "to balance institutional budgets at acceptable levels after as much as possible has been obtained from other sources,"[1] or whether it is set by determining what the traffic will bear after considering the type of student the institution is attracting in the competition among institutions.

Least Cost Ranges and Growth Patterns of Full-Time Equivalent Enrollment

Perhaps the most pressing economic question facing educators is determining if institutions of higher education exhibit levels

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[1]Howard R. Bowen, The Finance of Higher Education (Berkeley, California 94704, Carnegie Commission, 1968) p. 23.

or ranges of enrollment which provide essentially the same services at a lower cost per student. Cost differences for various enrollment levels are reflected by changes in the educational operating expenditures. For example, instructors are added to the faculty as the number of students rises. All costs which increase with the number of students are called variable. The issue is: do these variable costs increase, decrease, or remain the same with different levels (or ranges) of enrollment? Variable costs can not be isolated from educational operating costs and, in a sense, need not since the fixed cost element does not change.

In addition to identifying least cost levels of enrollment, it is also important to investigate the change in educational operating costs per student (FTEE) as institutions add to their student population from one period to another. This finding is in part related to the economies of scale question but is important in its own right. The question arises: if no least cost range(s) of full-time equivalent enrollment is identified, then what is the most desirable rate of growth of full-time equivalent enrollment when expansion is considered?

Adjustment for Price Changes

When it is necessary to adjust educational operating expenditures or plant value for changes in price to make yearly comparisons, one year may be used as a base year and the other year, or years, adjusted accordingly.

In this study, two indices are necessary, one for current educational expenditures which include instructional wages (professional) and non-instructional (non-professional) wages and goods, and another for the real value of physical plant.

An Index for Educational Operating Expenditures

There are two ways to adjust for price changes of educational operating expenses. One index was developed by the Office of Program Planning of the Office of Education and includes two components: professional wages and all other operating expenses. The component used for professional wages is the American Association of University Professors' average compensation scale.

The Consumer Price Index of the U.S. Bureau of Labor Statistics is used as the component for all other educational expenditures.

The rationale for including professional wages is that there have been no radical changes in the methods of instruction. Unlike most industry where labor's output has more than kept pace with wage increases, the output of most college instructors has remained at best constant. Increases in wages, while perhaps long overdue, have nonetheless increased the real cost of educating a student.

In order to combine the two indices into one, it is necessary to determine the weights of each factor.

The index for college costs, then, composed of the four items noted earlier, is:

$$CCI = WPW\ (AIAC) + WOK\ (ACPI)$$

Where:

WPW = $\frac{\text{Professional Wages}}{\text{Total Educational Expenses}}$

WOK = $\frac{\text{Total Educational Expenses Less Professional Wages}}{\text{Total Educational Expenses}}$

AIAC = AAUP Increase in Average Compensation from a Given Base Year

ACPI = Comsumer Price Index Issued by the Department of Labor

Weights were calculated, using information from the 1961-62 and 1963-64 U.S. Office of Education Financial Surveys of Institutions of Higher Education.

If: $WPW_y = \frac{\text{Inst. Wages + OW (Ed. Exp. - Inst. Exp.)}}{\text{Educational Expenditures}}$

Where Y indicates the year, then:

$$\text{WPW 1962} = \frac{1.84 + .69\ (3.70 - 2.22)}{3.70} = .77$$

$$\text{WPW 1964} = \frac{2.25 + .69\ (4.71 - 2.82)}{4.71} = .78$$

The mean weight for the two years is .775. Its complement, .225, is the weight for all other educational expenses. By using this information, the college cost index was calculated and follows in Table 1-3.

TABLE 1-3

INDEX OF COLLEGE COSTS FOR FISCAL YEARS
1961-2, 1963-4, 1965-6, AND 1966-7
(1963-4=100.0)

Year	Index of College Costs
1961-2	92.22
1963-4	100.00
1965-6	109.48
1966-7	115.54

The second method is merely to adjust the data using values for the consumer price index. The rationale for dropping the professional wage adjustment is that opportunity costs, defined as wages faculty could obtain in industrial or commercial profit-making institutions, have increased. Wage costs have gone up in these non-educational institutions because their profits have risen. Therefore, the increased wages paid to professionals in industry and commerce, and, by implication, in the educational institutions, are justified.

An Index for Physical Plant

The index to be used for physical plant is one developed by College Management magazine in August 1967.[1] It follows, with an adjustment of the base year to 1963-4. (Table 1-4)

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[1]"College Building Index," College Management (August, 1967).

TABLE 1-4

INDEX FOR PHYSICAL PLANT

Year	1957-59=100.0	1963-64=100.0
1961-62	107.8	95.7
1963-64	112.6	100.0
1965-66	119.6	106.2
1066-67	123.3	109.5

All of the above indices, although somewhat crude, will provide a more accurate comparison of yearly educational costs and plant value for institutions of higher education since they will allow yearly comparisons by expressing dollar amounts in terms of the base year prices. The specific index will be noted when used.

Scope and Limitations

This study will consider 362 institutions of higher education in the Northeast Region of the United States, that is, the following nine states: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont.

The reasons for limiting the study to this region are three: first, as the following table of student migration patterns indicates,

almost 90 percent of all students who reside within the Northeast Region and attend college do so within that area (see Table 1-5); secondly, studies[1,2] indicate that regional variations in institutions of higher education exist, both in an economic and sociological sense; lastly, methodology for part three of the study in which an attempt is made to identify determinants of change in the levels and patterns of expenditures includes (multiple and partial) regression analysis (variables to be defined below) and is lengthy in itself. With the existence of regional differences, analysis of all geographic areas would make this study unwieldy.

Institutions (by class) included in the study are those listed in Table 1-1. They represent 93.0 percent of the institutions located in the Northeast Region in 1963-4, and account for 93.7 percent of the total higher education enrollment.

Although the work concentrates on the 1963-4 fiscal period, data for fiscal 1961-2, 1965-6, and 1966-7 periods are used to complement or clarify fiscal 1963-4 data when available. While it would have been desirable to utilize more up-to-date financial data, there was some question as to the reliability of later surveys.

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[1]Astin, Alexander, W. "College Preferences of Very Able Students," (College and University, Spring 1965).

[2]Williams, A. N., Ed. The Sixty College Study . . . A Second Look (National Federation of College and University Business Officers Association, 1959).

TABLE 1-5

PERCENTAGE DISTRIBUTION OF STUDENT RESIDENTS IN THE NORTHEAST (NEW ENGLAND) AND MIDEASTERN REGIONS UNITED STATES, BY REGION OF COLLEGE ATTENDING, FALL 1963

	Region	Resident No.	Resident Percent	Region of Attendance Mideast	Region of Attendance New England	Region of Attendance All Other
All Students	Mideast	931,659	100.0	83.7	4.3	12.0
	New England	247,039	100.0	8.9	82.5	8.6
	Total	1,178,698	100.0	(88.7)		(11.3)
Undergraduate Students	Mideast	749,514	100.0	82.7	4.2	13.1
	New England	204,173	100.0	8.0	83.6	8.4
	Total	953,687	100.0	(87.9)		(12.1)
First Professional Students	Mideast	40,982	100.0	82.5	5.9	11.6
	New England	8,263	100.0	23.1	65.3	11.6
	Total	49,245	100.0	(88.4)		(11.6)
Graduate Students	Mideast	141,163	100.0	88.9	2.6	8.5
	New England	34,603	100.0	10.4	80.6	9.0
	Total	175,766	100.0	(89.8)		(10.2)

Source: Mabel Rice and Paul L. Mason, Residence and Migration of College Students, Fall 1963 U.S. Office of Education, Washington, D.C. 1965.

Not only was the reporting form changed after the 1963-4 fiscal period, which caused some confusion, but the response rates have been lower.

One final limitation: faculty and staffing ratios were unavailable for later years at the time of analysis. Since the emphasis of this study is on expenditure patterns, levels and growth rates, it is less important to have up-to-date figures than to have complete and reliable data. Primarily for these reasons the study will concentrate on the 1963-4 data, although fiscal year 1967 will be used extensively. Other limitations will be noted and adjustments made when necessary.

Data Sources and Definitions

Except in isolated cases, data used in this study were collected by the staff of the National Center for Educational Statistics of the United States Office of Education. Financial data were taken from questionnaires while faculty and enrollment data were transcribed to data files from published data. A copy of each questionnaire is available in Appendix III.

The full data collecting resources of the Office of Education were behind this study.

Following is a summary of the prime sources of data used (secondary sources will be noted as used):

A. Unpublished Sources

Financial Data: U.S. Office of Education "Survey of Financial Statistics of Institutions of Higher Education," Fiscal Years 1961-2 and 1963-4; and the "Higher Education General Information Survey for 1966-67," familiarly called HEGIS I (data is also published).

B. Published Sources

1. Garland G. Parker, "Statistics of Attendance in American Universities and Colleges," School and Society, January 1961; 1963; 1965.

2. U.S. Department of Health, Education, and Welfare, Office of Education, Fall Enrollment 1961, 1963, 1965. (U.S. Government Printing Office, Washington, D.C.)

3. U.S. Department of Health, Education, and Welfare, Office of Education, Faculty and Other Professional Staff in Institutions of Higher Education, Fall Term 1963.(Government Printing Office, Washington, D.C.)

4. American Association of Junior Colleges, Junior College Directory, (1315 Sixteenth Street, N.W., Washington, D.C. 20036).

5. "The Economic Status of The Profession," AAUP Bulletin, Summer 1962, 1964, 1966.

6. Life Insurance Agency Management Association, College Costs, 1961; 1963; 1965 (Hartford, Connecticut).

7. Cass, James and Birnbaum, Max, Comparative Guide to American Colleges, (Harper and Row, New York) 1966.

Institutions referred to in this study will not be identified by name, since financial data is sent requiring a pledge of confidence by the U.S. Office of Education. This will in no way hinder the planned analysis since the object of the study is to identify common patterns of funding rather than to identify institutions which deviate from mean values. Stratification of the sample by type, control, and size also minimizes the necessity of identifying specific institutions.

Financial Items

The U.S. Office of Education's Survey of Financial Statistics of Institutions of Higher Education for Fiscal Years 1961-2, 1963-4, and 1966-7 is the source for the financial items to be included in this study. (Complete definitions for each may be found by referring to the indicated parenthesized line number(s) of the 1963-64 Office of Education survey form included in Appendix III.) Data, reported in dollars, are divided by the FTEE to obtain average or per-student values.

I. Operating Revenue

A. Gross tuition--includes tuition and fee collections and remissions. (3)

B. Net tuition--is gross tuition less student aid costs. (3-G)

C. Education operating subsidy--educational operating expenses less net tuition. (24+25+26+27+28+G-3)

D. Federal grants--all funds received directly from Federal sources excluding student aid funds. (6b)

E. Total current income--including all income for current operations; educational, auxiliary services, student aid and general income. (D)

II. Operating Expenses

A. Administrative--executive, student personnel, and other staff costs. (24) (Student personnel includes all expenses for counseling, health, financial aid etc., and is included under administrative expenses unless otherwise noted [24a].)

B. Instruction and departmental research--includes all current expenses for instruction: faculty, staff, supplies, and research not separately budgeted. (25)

C. Extension services and public services--includes all non-degree credit instruction costs. (26)

D. Library services--salaries, books, etc. (27)

E. Physical plant operations--includes only expenses for instruction, administration, and libraries. (28)

F. Organized research--separately budgeted contract research. (29c)

G. Educational operating expenses--includes administrative, instructional and departmental research, library, and plant operation expenses only. (24+25+27+28)

H. Student aid--includes all payments and remission of tuition and fees. (G)

I. Total current expenses--includes educational, organized research, student aid, auxiliary, and general expenses. (H)

III. Physical Plant Book Value

End of fiscal year value for all physical facilities--land equipment, building and improvements. (V)

Enrollment

Enrollment data are from the U.S. Office of Education enrollment survey for Fall 1961, 1963, and 1966.[1] None of the data items reflects summer school enrollment which unfortunately is not generally available. It may be recalled in the analysis of student credit hours and full-time equivalent enrollment that, while the student credit hours reflected summer school enrollment, it did not seem to affect the strength of the relationship with fall enrollment data. In the one instance of junior colleges, where summer school enrollment was available, the results were consistent. In effect

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, Fall Enrollment 1961; 1963; 1965; 1966 (Washington, D.C. Government Printing Office).

then, using full-time equivalent enrollment consistently or proportionately overstates educational operating costs per student. This should not affect the inter-institutional relationships.

Students

Enrollments in the institutions whose programs consist wholly or principally of work normally creditable toward an Associate, Bachelor's, or higher degree.

A. Full-time students: those enrollments of at least 75 percent of a normal student-hour load. (FT)

B. Part-time students: any student not classified otherwise as full-time but falling within the definition of a student. (PT)

C. Full-time equivalent enrollment (FTEE): fall full-time enrollment plus one-third part-time enrollment (see AppendixIII for further details).

D. Undergraduate students (UG) include all students below baccalaureate degree level.

E. Graduate students (G) include all those students perusing an advanced degree beyond the baccalaureate degree.

Enrollment Mix

The enrollment mix will be used to differentiate instructional output. Items included in enrollment mix include:

1. Full-time equivalent enrollment (FTEE).
2. Graduate/total students (GRAD/TOTAL)
3. Males/total students (MALES/TOTAL)
4. Full-time/total students (FT/TOTAL)
5. Total part-time students (PT)
6. Selectivity level of student (LS)

Faculty and Other Professional Staff Summary

Data on faculty and other professional staff members included in this summary were taken primarily from U.S. Office of Education publications.[1] The items include:

1. Professional staff for administration--those persons primarily engaged in general administration services.
2. Professional staff for student personnel services--those persons primarily engaged in activities of a non-instructional nature but related to assisting students.
3. Faculty members--those persons engaged in whole or in part in the instruction of students. (Full-time equivalents will be determined for those on a less-than-full-time basis, below.)

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, Faculty and Other Professional Staff in Institutions of Higher Education, Fall Term, 1963 (Washington, D.C., U.S. Government Printing Office).

4. Professional library staff-includes head librarian, assistants, and other professionals.

5. Professional staff for organized research--includes faculty and other professionals engaged specifically full- or part-time for research work.

Full-time Equivalent Faculty

The following formula will be used to adjust for full-time equivalent faculty--FTEF: 1.00 full-time faculty + 1.00 full-time equivalent of part-time positions + .33 junior instructional staff. (The factor .33 used to adjust junior instructional staff is based on the full-time equivalent of part-time faculty determined by the institution.)[1] For two-year institutions only, which classify terminal programs leading to an associate degree as non-degree credit in the baccalaureate sense, all resident faculty in non-degree credit courses are added to the FTEF defined above.

Staffing Ratios

The professional staff ratios used, adjusted for enrollment, include:

1. FTEE/administrative staff (FTEE/ADMIN)

2. FTEE/student personnel staff (FTEE/SPS)

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, Faculty and Other Professional Staff in Institutions of Higher Education, Fall Term 1963 (Washington, D.C. Government Printing Office, 1964) p. 98.

3. Full-time/total faculty (FTF/TOTAL)

4. FTEE/library staff (FTEE/LS)

5. Decile of Ph.D.'s on the faculty (PHD DECILE)[1]

Methodology

The statistical techniques to be used in this study may need clarification in some instances. Listed below, although not necessarily in the order presented in the text, is a brief description of each technique and, when necessary, reference to published data on the subject.

1. Ratios

Three ratios will be used and should require no further explanation:

a. Ratios of parts to whole

b. Ratios of unlike items

c. Ratios of period 2 value to period 1

d. Change ratio--difference in values between period 1 and period 2, divided by the value in period 1.

2. Coefficient of variation (CV)

$$CV = \frac{\text{Standard Deviation}}{\text{mean}} \times 100$$

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[1]Bureau of Applied Social Research, "College Resource Index" (Unpublished quantitative ranking of selected resources by institution, Columbia University, 1964).

This is a measure of relative variability where the standard deviation is a measure of absolute variability in a frequency distribution. It is especially valuable in comparing distributions of unlike units.

3. Set Interval Analysis

Data is a row are ranked on a base variable, frequency intervals are selected and data in each interval are summarized by mean score and the coefficient of variation. For example, in a given class of institution, educational operating expenditures per student (FTEE) are signified as the base variable and are ranked from low to high. Tied to educational operating expenditures per student (FTEE) are a number of other institutional variables, so that when the ranking is complete, the other variables, while not ranked from high to low, nonetheless are ranked on the basis of educational operating expenditures per student (FTEE). After considering the distribution, educational operating expenditures per student (FTEE) are divided into set intervals selected by inspection, to provide a cross-section analysis of costs and the corresponding variables. All variables within each set are then summarized by the mean and coefficient of variation. (Table 2-4 is the first example in this study.) Trends may be viewed by inspection.

4. Regression Analysis[1]

Regression analysis is the method used to determine statistical relationships between two or more variables. The most common type of relation is the linear function, although other forms will be used in this study.

A. Linear regression analysis.--Consider a case involving paired observations on two variables, X, the independent variable, and Y, the dependent variable, where: a = constant factor; j = the number of variables; b = (see item g); Xj= the j^{th} observation of the independent variable; Y = the observation of the dependent variable. The purpose of a linear regression analysis is to determine a relationship which expresses Y as a function of X. The linear regression equation has the following general form where a and b represent coefficients that we wish to estimate from the paired observations:

$$Y = a + bX = b_2X_2 + \ldots + b_jX_j$$

When only two variables are involved it is referred to as a simple linear regression and when there are more than two variables it is

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[1]The substance of this section was taken mainly from portions of readings in three publications: a) General Electric Information Service Department, Regression Analysis. (Time Sharing Service-Program Library Users Guide--Unpublished); b) J. Johnston, Econometric Methods, (New York, Mc. Graw-Hill Book Co., 1963); c) Murray R. Speigel, Theory and Problems of Statistics (New York, McGraw-Hill Book Co., 1961).

called a multiple regression analysis. The simple case may also be referred to as a one-to-one analysis or bivariate case.

B. Polynomial Regression Analysis allows the determination of a non-linear relationship between two variables, X and Y. The general form of a polynomial is:

$$Y = a + bX + b_2X^2 \ldots b_nX^n$$

where n = highest number of degrees in equation with variables defined as in (A) above.

C. Coefficient of correlation, R, varies between -1 and +1. It is the ratio of the explained variation to total variation. It provides a numerical measure of the relationship between two or more variables. If the variables are perfectly related, the value of R is $\pm$ 1.0; with no relationship the value of R is zero.

D. Index of Determination (R^2) or Variance.--The square of the correlation coefficient--also called the variance--is equal to the proportion of the Y variance explained by the linear influence of X. An (R^2) value of 0.9 indicates that the least-squares regression of Y on X accounts for 81 percent of the variance in Y.

E. The term marginal R^2, or marginal contribution to the explained variance, means the total contribution of a single item to the variance of the multiple regression equation. It is the amount variance (R^2) would decrease if a given variable were removed from the analysis.

F. The partial correlation coefficient computes the partial correlation between Y and X_1 over and above the influence of a third variable X_2. That is, one attempts to remove the influence of X_2 from X_1 and Y to see what correlation exists between the unexplained residuals that remain. An example would be to determine the relationship between educational operating expenditures per student and enrollment, partialling out the effect of the student-to-faculty ratio on both educational operating expenses per student and enrollment.

G. The linear regression coefficient (b).--The effect on the dependent variable of a change in one or more of the independent variables. The larger the value of b, the greater the change in the dependent variable. In the linear multiple regression case, by holding all but one independent variable constant, the effect of a change in a single unit of that variable on the dependent variable is equal to the regression coefficient.

H. The Student's "t" Test is necessary when sample data are used for regression analysis to test for a level of significance. It is also valuable in the multiple case to test each regression coefficient for significance. It will be used sparingly since data for each class in the study represent at least 90 percent of the institutions and the marginal R^2 helps determine the importance of each variable in the multiple case.

The Organization of the Study

Considering the issues presented, five major areas for investigation have emerged. The results of the analysis will be presented in five chapters as follows:

1. A comparative analysis of 1963-4 resource allocations in colleges and universities of the Northeast region (Chapter 2).

2. Selectivity level of students and resource allocations for educational operations (Chapter 3).

3. The effect of enrollment size and mix upon resource allocations for educational operations (Chapter 4).

4. The relationship between physical plant and educational operating expenditures (Chapter 5).

Each of these chapters will include a brief discussion of the specific questions to be considered, the analysis, and a summary of the findings.

5. The final chapter, Chapter 6, will bring together the significant findings, consider the implications for present and future decision-making, and close with suggestions for directions of additional research.

CHAPTER 2

A COMPARATIVE ANALYSIS OF RESOURCE ALLOCATIONS OF COLLEGES AND UNIVERSITIES IN THE NORTHEAST REGION

Historically, cost studies of higher education have used the classifications of type and control when it was desirable to differentiate among institutions. Whether functions of institutions classified in this manner vary is unimportant at this point, although there is validity in expecting institutional differences in the selectivity level of students to reflect differences in services offered to students. Without concern for the differences at this time, seven groups of institutions will be analyzed and classified by type and control. They are summarized as follows with the abbreviations to be used:

Universities--Public	UN-PU
Universities--Private	UN-PT
Four Year--Public	FY-PU
Liberal Arts--Non-Sectarian	LA-NS
Liberal Arts--Religious	LA-R
Junior College--Public	JC-PU
Junior College--Private	JC-PT

Institutional resources may be measured in at least two ways: by placing a dollar value on each resource and simply by counting. Both measures will be used in this section for making institutional comparisons. Three questions, each of which is implied in the section heading, outline the chapter. They are:

1. What is the effect of the operating subsidy and net tuition upon educational operating expenditures?

2. What is the effect of selective staffing ratios on educational operating expenditures?

3. What is the relationship between educational operating expenditures and each of its components?

Data used in the chapter are primarily from the Fiscal Year 1964. They are supplemented with data from Fiscal 1962 and 1967, when necessary and available. Fiscal 1964 data were selected as the base year primarily because of their availability, comprehensiveness, and, most of all, for their reliability. Furthermore, it is doubtful that the organization, staffing patterns, and operating procedures of institutions of higher education in general changed significantly between Fiscal 1962 and 1967. Therefore, relationships between resources, financial and staff, and students among various classes of institutions, are probably also the same.

Data are analyzed in several ways. Mean values for classes have been calculated and compared with one another. To gauge the distribution of values around class means, of both similar and

dissimilar units, the coefficient of variation has been calculated. It is determined by dividing the class mean by the standard deviation and then multiplying the result by 100. This measure allows comparisons of variation measures of unlike items such as staffing ratios and educational operating expenses per student (FTEE). Generally speaking, the lower the coefficient of variation, the more representative is the mean value.

To compare the dollar return to the student in educational operating expenses per dollar of tuition paid, a simple ratio is used (EX 64/Net Tuition). It is computed by dividing educational operating expenses by the net tuition (net tuition being gross tuition less [-] student aid). The higher the value of this relationship, the greater the return on the educational investment, assuming equal educational operating expenses per student (FTEE). Another ratio which indicates the relative importance of the instructional function is determined by dividing educational operating expenses by total current expenditures (EX 64/Total Current Exp.). Total current expenses include educational operating expenses and, additionally, extension services, organized research expenses, auxiliary services, student aid costs, and all other current costs. The smaller this ratio is, the greater are non-instructional activities.

In those instances where multiple relationships need to be compared, regression analysis has been used. Explanation of the variables and the results will follow in the text.

Lastly, what is referred to as set interval analysis has been used to supplement or replace multiple regression analysis. One variable, from a set of variables, is selected as the base variable (this corresponds to the dependent variable in regression analysis) and sorted from low to high. Other institutional variables are moved along with the base variable (these variables correspond to the independent variables). The base variable is then stratified into ten or fewer intervals with the other institutional variables. The mean and the coefficient of variation for each set of variables in each interval is calculated and compared.

The Effect of Operating Subsidy and Net Tuition on Educational Operating Expenditures

Initial inspection of the class means and coefficients of variation for educational operating expenses per student (FTEE) in Fiscal 1964 reveals little evidence of any commonality in these costs, either between or within classes (Table 2-1). At first glance, mean values for public institutions appeared to have less variation than their private counterparts. This can be explained by the fact that only nine states from the Northeast region are included in this study and within each state public funds for public

TABLE 2-1

EDUCATIONAL REVENUE AND EXPENDITURE ITEMS AND SELECTED RATIOS FOR HIGHER EDUCATION INSTITUTIONS BY TYPE AND CONTROL 1963-64, NORTHEAST REGION[a]

Type and Control (Class) of Institution.	No.	Educational Operating Costs/ FTEE (EX 64)		Educational Operating Subsidy/FTEE		Net Tuition	EX 64/ Net Tuition	EX 64/ Total Current Expenses	
		$\overline{X}$	CV[b]	$\overline{X}$	CV	$\overline{X}$	$\overline{X}$	$\overline{X}$	CV
UN-PU	10	$1,469	20	$1,247	17	$ 241	$6.10	.57	23
UN-PT	28	2,132	46	1,138	90	1,001	2.15	.56	21
FY-PU	58	947	32	735	47	208	4.55	.74	12
LA-NS	65	1,776	42	665	101	1,111	1.60	.66	14
LA-R	103	1,222	40	455	174	767	1.60	.67	15
JC-PU	37	772	35	408	85	364	2.13	.85	14
JC-PT	61	1,341	48	739	104	502	2.70	.75	20

[a]To help understand mean values ($\overline{X}$) for public universities table may be read as follows: EX 64--Educational operating expenses are $1469 per student (Fiscal 1964); Operating Subsidy/FTEE --The average contribution of the institution to the cost of instruction was $1247 per student in Fiscal 1964; Net tuition--Each student contributed, on an average, $241 toward his educational costs; EX 64/Net Tuition--for every dollar a student contributes toward his education, $6.10 was expended totally by the institution; EX 64/Total Current Expenses--57 percent of all current expenses were spent of the education function.

[b]Coefficient of variation--CV = Standard deviation divided by mean ($\overline{X}$) multiplied by 100, the lower the value the more representative the sample.

Sources: U.S. Department of Health, Education, and Welfare, Office of Education "Higher Education General Information Survey" Unpublished Data, Fiscal 1964.

institutions are distributed by a formula method, usually based on the number of students.[1] The educational operating subsidy per student (FTEE) was also inconsistent by class, although the variation was greater for private institutions. The educational operating subsidy is defined as the difference between educational operating expenses and net tuition. Since there is wide class variation in both educational operating expenses and operating subsidy, it follows that net tuition also has wide class variation. Mean class values for net tuition reflect the wide differences in values for public and private institutions, as might be expected. Perhaps the most interesting aspects of Table 2-1 are the class differences in the net return to the student for his net tuition investment. While there is a wide difference in the net return in educational operating costs per dollar of net tuition in public and private institutions above the two year level, most of it can be explained by the difference in net tuition per student for each class of institution. For example, the net return in educational operating expenses in private universities for each dollar of net tuition is $2.15 compared with $6.10 in the public sector. At the same time, students in private institutions pay an average of $760 more in net tuition per year. If this amount is added to educa-

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[1]For a complete discussion on the techniques for distributing funds in public institutions, see James Miller, State Budgeting for Higher Education (Ann Arbor, Mich., University of Michigan, 1964)

tional operating expenses per student in the public sector ($1469 + 760 = $2229) and compared with educational operating expenses per student in the private sector ($2131), the difference in the net return begins to diminish. Similar results were obtained for four-year institutions. It appears that the higher net tuition paid by students in private four-year institutions is returned to them to a great extent in the form of increased educational operating expenses. By contrast, students in public institutions have a much larger share of their costs borne by the sponsoring public agency. Nothing has been said regarding the quantity or quality of educational resources by class, a topic reserved for later discussion.

Conditions in the junior colleges, although not as clearly defined as other groups, reflect the same trend. However, initially the net return on the net tuition investment in the private junior colleges exceeded that in the public sector. In retrospect then, not only does the amount of money an institution expends on instruction vary but so does the source of those funds--net tuition and the educational operating subsidy.

In another respect, the ratio of educational operating expenses to total current expenses within each class had a relatively high degree of consistency (Table 2-1). Furthermore, there were rather distinct values of the ratio for each class and for certain types of institutions. Universities, for example, used 57 percent

of their total current funds for educational operating expenditures while private liberal arts colleges used about 68 percent. Institutions by class, then, expend a rather consistent amount of current funds on the education function, despite wide variation by class in educational operating expenditures per student (FTEE) and operating subsidy per student (FTEE).

Looking next at Fiscal 1967, we discover that the same general class patterns of Fiscal 1964 emerge again (Table 2-2). Private institutions continued to expend more on the instructional function, charge more tuition, and return less in instructional expense dollars than in the public sector. However, absolute values,without an adjustment for price changes, and the two ratios differ. The absolute values of educational operating costs per student are larger by $250 to $300 in the public sector, and from $125 to over $500 in the private sector, the largest increases in both classes occurring at the university level and the smallest occurring in public junior colleges and religiously controlled liberal arts colleges. The operating subsidy increased in all public institutions from $90 to $360, with junior colleges experiencing the largest increase. This latter increase is due in large part to the increase in the number of junior colleges; from 35 in 1963-64 to 52 in 1966-67. Many of these schools are located in states which charged low tuition and, consequently, the educational operating subsidy per student increased substantially and, at the

TABLE 2-2

SELECTED EDUCATIONAL REVENUE AND EXPENDITURE ITEMS AND SELECTED RATIOS FOR HIGHER EDUCATION INSTITUTIONS BY TYPE AND CONTROL 1966-7, NORTHEAST REGION[a]

Type and Control (Class) of Institution.	No.	Educational Operating Costs/ FTEE (EX 67)[b]		Educational Operating Subsidy/FTEE[c]		Net Tuition		Ex 67/ Net Tuition	EX 67/ Total Current Expenses	
		$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	$\overline{X}$	CV
UN-PU	9	$1,763	16	$1,334	NA	$ 429	59	$4.12	.54	20
UN-PT	28	2,655	53	1,507	NA	1,148	27	2.37	.53	30
PY-PU	56	1,223	33	968	NA	255	56	4.80	.73	16
LA-NS	72	2,023	42	624	NA	1,399	28	1.45	.61	15
LA-R	106	1,347	32	360	NA	987	43	1.36	.64	17
JC-PU	52	1,037	NA	766	NA	271	52	3.84	.83	NA
JC-PT	61	1,657	60	716	NA	941	71	1.82	.71	23

[a]See note [a] Table 2-1 for interpretation of values.

[b]EX 67 = educational operating expenses/FTEE; $\overline{X}$ = mean value; CV = coefficient of variation.

[c]Educational operating subsidy is derived by subtracting net tuition from educational operating expenses/FTEE and does not include subsidy to extension education. Coefficient of variation not available = NA.

Source: See Table 2-1.

same time, the net tuition fell from $364 to $271. Net tuition, in public universities and four-year institutions, increased about $70 and $50 respectively; less than the increase in the operating subsidy in both cases. In the private universities educational operating subsidy per student increased by almost $400. At the same time, the educational operating subsidy, in private four-year and junior colleges, fell between $20 and $95. Net tuition increased in all private institutions, by $147 in universities to more than $400 in junior colleges. The change noted in each of the three expenditure items can be seen more vividly by looking at the educational operating expenses to net tuition ratio. It increased in private universities and public four-year and junior colleges. The trend in private universities is in large part distorted because of an increase in a strongly related activity; that of organized research.[1] In private universities, research expenditures increased from $1110 per student in Fiscal 1964 to $1978 in Fiscal 1967.[2] The increase in educational operating expenses per student during this period is due not so much to the increase in educational services as to the ". . . fact that universities share in the cost

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[1]In Fiscal 1964, educational operating costs and organized research expenditures were correlated in public and private universities at .82 and .90 respectively.

[2]Research expenditures increased from $421 to $517 per student (FTEE).

of research projects by amounts considerably in excess of that required."[1] The increase in the ratio for public four-year and two-year colleges is, in part a manifestation of increased state support for higher education from 1964 to 1967. Public universities and private four-year and junior colleges, in Fiscal 1967, offered the student less for his investment, although in absolute amounts all of the private schools continued to expend more on the instructional function than their counterparts in the public sector. However, students attending these four classes of (private) institutions paid for a greater share of their educational operating expenses in Fiscal 1967.

All public institutions were required to carry the greatest share of increasing enrollments over the time period in question.[2] One solution to this dilemma has been to increase class size and another to increase tuition. As a result, students in public universities received less for their net tuition dollar, notwithstanding an increase in educational operating expenses per student. The increase held even with an adjustment of 8 percent for price changes. The ratio of instructional to total current expenses had

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[1] Committee on Government Operations, United States Senate, Hearings on Federal Support of Project Grants: Indirect Cost and Cost Sharing (Washington, D.C., April 22, 23, and May 1, 1969) p. 61.

[2] U.S. Department of Health, Education, and Welfare, Office of Education, Opening Fall Enrollment, 1963, 1967 (Government Printing Office, Washington, D.C.)

substantially the same set of values in Fiscal 1967 and in Fiscal 1964. Values were slightly reduced, by one to five points, in Fiscal 1967, suggesting an enlargement of other activities to some degree.

To study the same set of variables for Fiscal 1964 only, a set interval analysis, using educational operating expenses per student as the base, was compiled (Table 2-3).

Except for junior colleges, set interval analysis indicates that there is a strong relationship, by set interval, between educational expenditures and the operating subsidy. However, as educational operating expenses per student (FTEE) increase, diminishing proportions of the operating costs are borne by the student. This occurred in all classes, except public universities, with the result that students in the lower expenditure sets pay a greater proportion of their educational operating expenses. This is also evident when we consider the return to the student in educational operating expense dollars for every dollar of net tuition invested. In low expenditure institutions this return is considerably less than in the high expenditure institutions. For example: in set intervals for private non-sectarian liberal arts colleges, the return in educational operating costs in the low expenditure institutions averages about $1.45 for every $1.00 invested by the student, while in the high expenditure institutions, the return is $3.62 for every $1.00 invested. The same pattern is

TABLE 2-3

SET INTERVAL ANALYSIS BASED ON EDUCATIONAL OPERATING EXPENSES/FTEE FOR THE OPERATING SUBSIDY, NET TUITION, AND PERCENT EDUCATIONAL EXPENSE TO TOTAL CURRENT EXPENSES BY TYPE AND CONTROL OF INSTITUTION, NORTHEAST REGION, 1963-64, PER FTEE (IN DOLLARS)

Range of EX 64[a]	No. in Set	EX 64[b]		Operating Subsidy/ FTEE		Net Tuition	EX 64/ Net Tuition	EX 64/Tot. Current Expenses	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$		$\bar{X}$	CV
Universities--Public									
1,100-1,299	4	1,221	3	1,103	12	118	10.35	.62	29
1,300-1,499	2	1,396	1	1,226	9	170	8.21	.54	1
1,500-1,799	2	1,562	2	1,153	10	409	3.82	.59	10
1,800-2,004	2	1,947	3	1,546	1	401	4.85	.52	8
Universities--Private									
700- 999	4	885	9	97	78	788	1.12	.71	13
1,000-1,599	6	1,303	10	315	62	988	1.32	.66	13
1,600-2,099	5	1,970	5	763	21	1,207	1.63	.53	10
2,100-2,699	6	2,294	6	1,160	24	1,134	2.02	.51	13
2,700-3,699	4	3,261	6	2,270	20	991	3.29	.47	9
3,700-4,199	3	3,903	4	3,155	10	748	5.22	.41	9
Four Year--Public									
400- 599	6	511	6	316	14	195	2.62	.78	16
600- 699	9	647	5	450	26	197	3.28	.68	15
700- 799	6	738	3	555	16	183	4.03	.72	13
800- 899	8	850	4	567	13	183	4.64	.76	7
900- 999	5	947	4	685	16	262	3.61	.76	5
1,000-1,099	7	1,057	3	782	12	275	3.84	.79	11
1,100-1,199	6	1,166	2	914	11	252	4.63	.78	11
1,200-1,299	3	1,241	1	1,163	2	78	15.91	.72	4
1,300-1,399	4	1,348	2	1,269	4	79	17.06	.71	2
1,400-1,999	4	1,584	13	1,474	10	74	21.41	.75	8

TABLE 2-3 (Continued)

Range of EX 64	No. in Set	EX 64		Operating Subsidy/ FTEE		Net Tuition	EX 64/ Net Tuition	EX 64/Tot. Current Expenses	
		$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$		$\overline{X}$	CV
Liberal Arts--Non-Sectarian									
500- 799	3	600	9	106	44	454	1.45	.76	10
800- 999	6	899	7	224	19	675	1.33	.69	17
1,000-1,199	6	1,084	6	230	66	853	1.27	.73	10
1,200-1,399	5	1,310	3	299	NA	1,011	1.30	.57	13
1,400-1,599	10	1,457	3	389	52	1,069	1.36	.64	9
1,600-1,799	10	1,718	2	524	76	1,194	1.44	.62	10
1,800-1,999	4	1,881	3	610	23	1,272	1.48	.60	2
2,000-2,499	11	2,262	6	839	33	1,423	1.59	.69	16
2,500-2,999	5	2,733	7	1,288	24	1,445	1.89	.63	10
3,000-4,100	5	3,446	11	2,496	15	950	3.62	.66	7
Liberal Arts--Religious									
300- 799	11	702	20	167	54	535	1.31	.62	16
800- 899	16	853	4	151	85	700	1.22	.64	20
900- 999	12	952	3	151	97	789	1.21	.68	12
1,000-1,099	11	1,061	3	320	54	733	1.45	.67	8
1,100-1,199	12	1,168	2	364	56	795	1.47	.72	14
1,200-1,299	12	1,250	2	439	48	809	1.55	.74	11
1,300-1,399	6	1,358	2	295	43	1,063	1.28	.63	2
1,400-1,599	7	1,475	4	652	64	823	1.79	.69	6
1,600-1,999	9	1,816	7	817	14	999	1.82	.69	10
2,000-3,300	7	2,573	18	1,997	51	567	4.46	.75	12
Junior Colleges--Public									
200- 499	8	422	19	180	89	242	1.74	.91	10
500- 599	5	542	4	189	78	353	1.54	.83	6
600- 799	6	739	4	287	73	452	1.63	.89	8
800- 899	5	844	1	438	64	406	2.08	.85	11
900- 999	4	954	4	851	14	103	9.26	.69	12
1,000-1,099	5	1,040	2	646	48	394	2.64	.90	12
1,100-1,299	4	1,202	5	549	86	653	1.84	.78	21

TABLE 2-3 (Continued)

Range of EX 64	No. in Set	EX 64		Operating Subsidy/ FTEE		Net Tuition	Ex 64/ Net Tuition	EX 64/Tot. Current Expenses	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$		$\bar{X}$	CV
Junior Colleges--Private									
200- 599	7	494	26	90	94	404	1.22	.81	22
600- 799	6	696	8	237	94	459	1.52	.80	19
800- 999	7	936	4	283	74	653	1.43	.71	19
1,000-1,199	7	1,109	5	639	57	470	2.36	.67	16
1,200-1,399	9	1,286	5	363	80	923	1.39	.68	23
1,400-1,599	9	1,523	4	1,008	48	565	2.70	.78	14
1,600-1,799	4	1,675	4	802	51	873	1.92	.75	25
1,800-1,999	3	1,930	2	1,088	63	842	2.29	.71	8
2,000-2,499	6	2,232	7	1,846	37	386	5.78	.79	21
2,500-3,499	3	2,959	10	2,233	50	726	4.08	.77	13

[a]Range of EX 64--Set interval indicating the range of educating operating expenses per student. The first set under public universities includes, for example, all institutions with educational operating expenses between $1100 and $1249 for Fiscal year 1964. There are four Northeastern institutions within this set interval.

[b]See Table 2-1, notes [a] and [b], for meaning of each value starting with EX 64. The only difference is that values in this table represent set intervals as opposed to class values in Table 2-1.

Source: See Table 2-1 for data sources.

applicable for each class although there are differences in degree, with control appearing to be a factor. The measures of variation for educational operational costs/FTEE and the operating subsidy are quite strong for each interval in public universities and four-

year colleges. For all other classes, variation measures for educational operating costs/FTEE are strong by set interval and although the variation measures fluctuate in strength, the coefficients of variation are stronger than the corresponding measure of variation for the class mean (Table 2-1).

Variation in all classes was stronger at the high expenditure levels, suggesting a reliance on other income rather than net tuition for meeting current operating costs. Two methods were mentioned earlier for setting net tuition. It is determined after fixing expenditure levels and then subtracting other current income from this amount, or it is a function of market forces; that is, other institutions and/or the affluence of the student attending the institution. The findings suggest that in private institutions, at least, net tuition is some combination of these two methods, depending on the prestige and wealth of the institution. As Table 2-3 illustrates, most of the high expenditure level institutions have the wealth with which to attract the students they desire, if the operating subsidy is any indication. Generally, the ability level of students enrolled in the institution is an indication of the success of the school in establishing a high academic image. The relationship between ability level and resources will be the subject of the analysis in Chapter 3, at which time further discussion on the net tuition question will be considered.

The ratios of educational operating expenditures to total current expenditures, by set, generally had coefficients of variation in all classes which were more consistent than were class values (Table 2-1), in themselves strong. The ratios were not consistent over all types of institutions. However, they fell as costs rose in three groups: the two classes of universities and private liberal arts colleges. A smaller ratio, as noted earlier, reflects the degree of activity of additional functions of the institutions, such as research, some of which may have educational value to the student. Therefore, as educational operating expenditures per student (FTEE) rise, the portion of all current expenditures allocated to educational operations falls and other institutional functions increase, giving the student even more resources, and in a sense a higher return for his tuition dollar.

A question appears at this point: do students receive the same level of services, regardless of the class of institution if expenditure levels are the same? Looking only at operating expenditures and the educational operating cost to total current expense ratio, some consistency is noted in the values for universities and private liberal arts colleges, but hardly enough proof given the detail to date. Further discussion on this question will follow in section 2 of this chapter in which educational operating expenditures and staffing ratios will be compared.

The Effect of Selected Staffing Ratios on Educational Expenditures

To measure the quantity and certain qualitative characteristics of the faculty and staff, a number of related ratios were calculated. The relationship of faculty and staff, on the level of educational operating expenditures, will also be explored. The ratios include: full-time to total faculty (FTF/Total), decile of Ph.D.'s on faculty (PhD), Students to faculty (FTEE/FTEF), students to administrative staff (FTEE/Admin.), and students to student personnel staff (FTEE/SPS). These ratios represent all professionals with the exception of library staff (Table 2-4). Since library costs constitute only 5 percent of educational operating costs, including acquisitions, their absence should not affect the analysis to any great extent.

Comparisons of average ratio values and their measures of variation will assist in identifying some consistency in policy or operations, within and across class lines. Mean ratio values for the set of five ratios vary within and over the seven classes. The full-time to total faculty ratio was perhaps the most consistent. Further, a distinct pattern was observable by type of institution. For universities the ratio ranged from .69 to .70; for four-year institutions it ranged from .76 to .80; and for two-year institutions, from .60 to .66. The mean Ph.D. decile for universities and private non-sectarian liberal arts colleges ranged

TABLE 2-4

FACULTY AND STAFF RATIOS AND CHARACTERISTICS STAFFING RATIO, MEANS AND VARIATION MEASURES FOR INSTITUTIONS OF HIGHER EDUCATION, 1963-64, NORTHEAST REGION[a]

Type and Control of Institution	FTEF/ Total		Ph.D. Decile		FTEE/ FTEF		FTEE/ Admin.		FTEE/ SPS	
	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
UN-PU	.70	24	6.1	43	13.0	15	300	62	215	59
UN-PT	.69	14	5.6	52	11.6	34	216	74	230	58
FY-PU	.79	20	4.3	65	18.6	23	255	57	280	81
LA-NS	.80	16	6.4	42	13.6	40	87	74	205	160
LA-R	.76	18	3.9	56	14.2	30	87	54	138	82
JC-PU	.60	43	NA	NA	15.2	38	203	73	333	91
JC-PT	.66	36	NA	NA	12.1	55	45	82	80	116

[a]To help understand the table, values for public universities may be interpreted as follows for $\bar{X}$:

FTEF/Total--70 percent of faculty are full-time staff members in public universities.

Ph.D. Decile--The number of faculty with Ph.D.'s place institution in the 6th decile.

FTEE/FTEF--There are 13 students for every faculty member.

FTEE/Admin.--There are 300 students for every administrator.

FTEE/SPS--There are 215 students for every member of the student personnel staff.

Source: U.S. Department of Health, Education, and Welfare, Office of Education, Faculty and Other Professional Staff in Institutions of Higher Education, Fall Term 1963-64, (Washington, D.C., Government Printing Office).

Opening Fall Enrollment, 1963, (Washington, D.C., Government Printing Office).

from 5.6 to 6.4, while state and religiously controlled four-year institutions had mean ratio values of 4.3 and 3.9 respectively. Some consistency in the students-to-faculty ratio was observed in universities and non-sectarian liberal arts colleges. Values ranged from 11.6 in private universities to 13.6 in non-sectarian liberal arts colleges. Although the mean class values for the students-to-student personnel staff ratio for the universities and non-sectarian four-year liberal arts colleges implied some consistency, variation measures suggest wide differences within each class.[1]

Mean class values, when used alone, have limited use in this paper. It is necessary to understand the relationship between each ratio and educational operating costs per student (FTEE) both on a one-to-one basis and in the multiple sense. The impact of variations in educational operating costs per student, through the influence of staffing ratios, is basic to the goal of this study; the identification of common cost patterns. Without an adjustment for cost, comparisons of staffing ratios are incomplete. The bivariate, or one-to-one analysis, indicates that as the number of faculty and staff members increases, educational operating costs

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[1]Interestingly enough, public junior colleges, which pride themselves on their counseling function, had the highest students-to-student personnel staff ratio, the second highest students-to-faculty ratio, and the fourth highest students-to-administrative staff ratio. In the quantitative sense, at least, there appears to be some question as to the validity of their assertion.

per student also increase. This applies to all classes of institutions as data in the last three columns of Table 2-5 indicate.

TABLE 2-5

LINEAR CORRELATION COEFFICIENTS FOR EDUCATIONAL EXPENDITURES AND SELECTED STAFFING RATIOS BY TYPE AND CONTROL OF INSTITUTION, 1963-64, NORTHEAST REGION[a]

Type and Control of Institution	Correlation Coefficients Between				
	EX 64 and FTEF/Total	EX 64 and Ph.D.Decile	EX 64 and FTEE/FTEF	EX 64 and FTEE/Admin.	EX 64 & FTEE/SPS
UN-PU	.28	.33	-.44	-.42	-.35
UN-PT	.04	-.04	-.54	-.44	-.20
FY-PU	.01	.26	-.54	-.38	-.21
LA-NS	.18	.32	-.43	-.26	-.24
LA-R	-.32	-.15	-.53	-.46	-.40
JC-PU	-.06	NA	-.55	-.51	-.38
JC-PT	.56	NA	-.20	-.15	-.25

[a]Each table value represents the simple correlation coefficient between educational operating expenditures (EX 64) and the indicated staffing ratio. See also Table 2-3 for definitions of each staffing ratio.

Source: See Table 2-1 and 2-4 for source of data.

Further, with the exception of religiously controlled liberal arts colleges and two-year public institutions, educational operating costs fell as the number of part-time faculty members increased. The exceptions may be explained in part by the fact that most full-time faculty in religiously controlled institutions are members of a religious order and are paid less than teachers with similar

qualifications who are lay persons. Furthermore, part-time faculty in religious institutions are usually lay personnel. In public junior colleges, the large class sizes and heavy teaching loads of the full-time faculty may offset the traditionally low cost of using part-time faculty members, i.e., these faculty receive few or none of the fringe benefits of full-time staff members.

The inconsistency in the other ratio, Ph.D. decile, suggests that factors other than wages attract qualified faculty members. Institutional prestige, love of teaching, and religious affiliation are possible explanations. When considered with all ratios in the multiple analysis, the latter two ratios explained the least amount of variance in educational operating costs/FTEE, while the students-to-faculty ratio explained the most (Table 2-6).

Close observation of Table 2-6 reveals that the students-to-faculty ratio explains more of the variation in educational operating costs than any other four staffing ratios.[1] In fact, in most cases, it alone exceeded the contributions of the other four variables to the explained variance. Over all, the five ratios were responsible for over half of the variance in universities and non-sectarian liberal arts institutions. Except for private junior

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[1]The basis of the observations in Table 2-6 is the marginal R^2 or the unique contribution of each variable to the total explained variance. This is the amount that the explained variance drops if one independent variable is removed from the multiple analysis.

TABLE 2-6

MARGINAL CONTRIBUTION TO THE VARIANCE IN THE MULTIPLE LINEAR REGRESSION ANALYSIS BETWEEN EDUCATIONAL EXPENDITURES/ FTEE AND FACULTY AND STAFFING RATIOS BY TYPE AND CONTROL OF INSTITUTION, 1963-4, NORTHEAST REGION

Type and Control of Institution	Multiple Correlation Coefficient (R)[b]	Explained Variance (R^2)	Marginal R^2 [a]				
			FTEF/ Total	Ph.D.'s Decile	FTEE/ FTEF	FTEE/ Admin.	FTEE/ SPS
UN-PU	.84	.71	.08	.15	.56	.08	.07
UN-PT	.74	.54	.04	.06	.19	.13	.02
FY-PU	.66	.44	.00	.05	.16	.11	.02
LA-NS	.76	.58	.01	.06	.26	.01	.01
LA-R	.64	.42	.08	.04	.15	.00	.04
JC-PU	.63	.40	.04	NA	.28	.02	.00
JC-PT	.59	.35	.04	NA	.09	.01	.00

[a]The marginal contribution to the explained variance (Marginal R^2) represents the unique contribution of a single independent variable to the explained variance (R^2). It is the amount R^2 would decrease if a given variable were removed from the multiple regression analysis.

[b]The multiple correlation analysis includes educational operating costs/FTEE and each of the five ratios identified. They are listed under the marginal R^2 heading. The constant value and the beta coefficients for the equation are indicated in Table 2-7. See Table 2-4 for interpretation of the staffing ratios.

Source: See Tables 2-1 and 2-4 for source of data.

colleges, they explained over 40 percent of the variance for all classes. All classes exhibited rather strong multiple correlations between educational operating costs per student and the staff ratios, ranging from a low of .59 in private junior colleges to .84 in public universities. It would appear that these five

staffing ratios are very important in affecting not only the variation but also the movement of educational operating costs per student (FTEE). The three classes of institutions with the strongest multiple relationships, private and public universities and non-sectarian liberal arts colleges, also exhibited the greatest commonality in mean class value (Table 2-4). As a point of information, the relationships derived in Table 2-6 came from a multiple regression analysis for each class, using institutional educational operating expenses and institutional values for each staffing ratio. The beta coefficients and the constant factors for each equation are listed in Table 2-7. Inspection of each beta coefficient, which can also be thought of as the cost of changing a staff ratio by one unit while holding all the other staffing ratios constant, suggests wide variation in the amounts institutions spend for professional staffing. Yet, while some consistency in staffing patterns have been identified, it is difficult to determine if institutional trade-offs of staffing, such as faculty preparedness for lower students-to-faculty or students-to-administration ratios, do occur. Comparative costs by class of institution for one set of constant staffing ratios were computed to make class cost comparisons. They were selected within a reasonable range of values considered feasible for each class of institution.

Constant factors were applied to universities and four-year colleges and to two-year colleges, (see Table 2-8).

TABLE 2-7

BETA COEFFICIENTS AND CONSTANT FACTOR FOR THE MULTIPLE REGRESSION EQUATIONS WHERE EDUCATIONAL OPERATING EXPENSES/FTEE IS A FUNCTION OF THE FIVE STAFFING RATIOS FOR NORTHEAST REGION INSTITUTIONS OF HIGHER EDUCATION, 1963-4[a]

Type and Control	Constant Factor for Regression Equation (in dollars)	Regression Equation Beta Coefficients (values in dollars)				
		FTEF/ Total	Ph.D. Decile	FTEE/ FTEF	FTEE/ Admin.	FTEE/ SPS
UN-PU	2,320.40	8.50	55.60	-142.28	0.846	-0.879
UN-PT	3,274.80	22.80	-104.00	-117.60	-2.380	-1.160
FY-PU	1,521.80	0.95	27.60	-29.30	-0.710	-0.170
LA-NS	2,902.00	-3.90	70.00	-77.2-	-1.660	-0.300
LA-R	2,873.0	-11.70	50.20	-57.71	0.044	-0.963
JC-PU	1,133.8	2.15	NA	-2.58	-0.390	-0.060
JC-PT	1,652.0	5.64	NA	-45.90	-3.040	o.163

[a]Each beta coefficient may be thought of as the amount educational operating expenses per student are increased by adding one unit of that particular variable while holding all other staffing ratios constant. See Table 2-4 for interpretation of staffing ratios.

Given the same ratios, some consistency in costs was evident only in two classes; public universities and privately-controlled non-sectarian four-year institutions.

Lower staffing ratio costs, as exhibited in public four-year institutions, may be a reflection of other conditions. One is the distortion in educational operating expenditures per student (FTEE); that is, public institutions in a given state spend substantially the same amount per student, and no weight adjustment

TABLE 2-8

COMPUTED EDUCATIONAL OPERATING COSTS PER STUDENT (FTEE) FOR A SERIES OF REGRESSION EQUATIONS BY CLASS OF INSTITUTION

Type and Control	Computed Value[a] (in Dollars)
UN-PU	$2,048
UN-PT	2,603
FY-PU	1,791
LA-NS	1,946
LA-R	1,624
JC-PU	964
JC-PT	1,056

[a]The following constant factors were applied to the equations in Table 2-7 to make the above cost comparisons:

Type	Other than 2 Yr.	Two Year
FTF/Total	.80	.70
Ph.D.	7.0	NA
FTEE/FTEF	10.0	14.0
FTEE/Admin.	200.0	300.0
FTEE/SPS	100.0	200.0

Source: See Table 2-1 for data sources.

was made for institutions by State. Another is that in 1963-64 most four-year public institutions did not offer high cost technical programs, since they were primarily teacher training institutions at that time.

Lower costs in religiously controlled institutions may be a result of the large number of religious on the faculty who are paid less than true market value for teaching services, as suggested earlier. Costs in private universities are, in all probability,

a reflection of organized research activities and graduate study programs.

Public and private junior college staff costs were fairly consistent. However, they may not be compared with the other classes because no adjustment was available for the number of Ph.D.'s on the faculty and a unique set of variables was used.

Overall, the application of the constant staffing factors did not produce constant educational operating costs. However, this may be more a deficiency in the methodology, and perhaps tradition, rather than fact. For example, private universities may wish to reduce educational operating costs per student. Do they increase, by one, the student-to-faculty ratio (FTEE/FTEF), while holding all other ratios constant? (Using mean class values for illustration, educational operating costs per student of $2,132.00 [Table 2-1] would decrease by $117.60 [Table 2-7].) Or do they reduce the number of Ph.D.'s on the staff, again holding all other ratios constant, thus decreasing educational operating costs per student by $104.00 (Table 2-7), another one of the choices available? In making a staffing decision, institutions may use educational, traditional, cost-effectiveness, or a combination of these reasons as a basis. Therefore, although prices that institutions are willing to pay for staff may be competitive (constant), the staffing mix may differ to the extent that intra-class comparisons of staffing costs are not too revealing. This

inconsistency in staffing by class is manifested in Table 2-6 which reveals differences in the unique contribution of each staffing ratio on educational operating costs per student (FTEE). Only the student-to-staff ratio was consistent in explaining changes in educational operating costs.

The Distribution of Components of Educational Operating Expenses by Class of Institution

Over a 13-year period, Fiscal 1954 to 1967, the components of educational operating expenses (administrative, instructional, plant operating, and library costs) displayed a high degree of consistency in both the public and private sectors. Although the absolute amounts of educational operating expenses vary considerably between the public and private sectors and by control of the institution, plant operating and library costs account for about the same relative amounts of educational operating costs in each year. Over the time period, the relative share of each component has changed to some extent. In 1953-54, library costs accounted for 4.5 and 4.7 percent of educational operating costs in the public and private sectors, respectively (Table 2-9). By 1966-67, these had grown to 5.6 and 6.0 percent. Plant operating costs for the two years in question, dropped from 17.9 and 16.8 to 13.3 and 13.7 in the public and private sectors, in that order. Instructional costs maintained about the same relative share, over the same time period, although they differed considerably by control. In

TABLE 2-9

COMPONENTS OF EDUCATIONAL EXPENDITURES FOR PUBLIC AND PRIVATE INSTITUTIONS AS A PERCENT OF TOTAL FOR AGGREGATE, UNITED STATES, 1953-54 to 1966-67

	53-54	55-56	57-58	59-60	61-62	63-64	65-66	66-67
Public Institutions								
Educational Expenses	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Administration	14.2	14.4	15.6	16.0	16.2	16.9	16.7	16.8
Instruction	63.4	63.7	63.1	63.5	63.6	63.6	64.5	64.3
Libraries	4.5	4.4	4.7	4.7	4.7	4.9	5.5	5.6
Plant Operation	17.9	17.5	16.9	15.6	15.6	14.6	13.4	13.3
Private Institutions								
Educational Expenses	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Administration	22.6	23.9	24.0	24.2	24.7	25.2	25.3	25.2
Instruction	55.7	55.1	55.3	55.8	55.3	54.9	55.0	55.0
Libraries	4.7	4.6	4.6	4.7	5.0	5.2	5.7	6.0
Plant Operation	16.8	16.4	16.1	15.4	15.0	14.7	13.9	13.7

Source: U.S. Office of Education, Survey of Financial Statistics of Institutions of Higher Education, 1953-54, 1955-56, 1957-58, 1959-60, 1961-62, 1963-64, 1965-66, and 1966-67.

the public institutions, instructional costs accounted for 63.4 percent of educational operating costs in 1953-54 and 64.3 in 1966-67, while in the private sector, the values were 55.7 and 55.0 for the same time period. Administrative costs grew 2.6 percentage points in each sector, although differing in relative shares; from 14.2 to 16.8 in the public and 22.6 to 25.2 in the private schools. Overall, the great difference in relative costs can be explained by looking at the figures for 1966-67. Administrative costs in the public sector are lower by about the same amount that relative instructional costs are greater. The interesting point in this relationship is that because public institutions have less to spend in absolute amounts on the educational function, it is necessary to devote a larger relative share of educational operating costs to the instruction function if they wish to compete for quality faculty and staff. The data suggest that this is the case. As a consequence, public institutions are able to offer fewer administrative services to their students.

Finally, over the thirteen-year period that plant operating costs were demanding a progressively smaller proportion of educational operating costs, the average size of institutions was growing.[1] In part, this is an example of the functioning of the

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, Opening Fall Enrollment, (Government Printing Office, Washington, D.C., 1953-67).

concept of economies of scale. The same pertains to library operations even though the overall trends have been upward.

In the Northeast Region, data are available for 1961-62, 1963-64, and 1966-67 (Table 2-10). The general trends observed for the national data were also true by institutional type and control, although the relative amounts expended on each component differed by type of institution. Universities, for example, generally spend less in relative terms on administration and more on instruction than four-year or two-year institutions. The pattern of relative plant operating and library costs are mixed throughout most classes. However, private junior colleges and religiously controlled liberal arts colleges do spend an unusually large relative amount of the educational operating costs on the plant operations. Institutions in these two categories also spend the smallest relative share on the instructional function. Of interest, for a later discussion, is the fact that over the 1961-62 to 1966-67 period, the average size (FTEE) of institutions of higher education in the Northeast region also increased.

Absolute values of the components of educational operating expenses were not used in this analysis since they vary among classes to the same extent that educational operating expenses per student vary among classes. The commonality of relative component costs and the variation in absolute educational operating costs,

TABLE 2-10

COMPONENTS OF EDUCATIONAL EXPENDITURES BY TYPE AND CONTROL AS A PERCENT OF EDUCATIONAL OPERATING EXPENSES FOR HIGHER EDUCATION INSTITUTIONS, 1961-62, 1963-64, and 1966-67, NORTHEAST REGION

Type and Control of Institution	Administration			Instruction			Library			Plant Operation		
	61-62	63-64	66-67	61-62	63-64	66-67	61-62	63-64	66-67	61-62	63-64	66-67
UN-PU	18.2%	18.7%	17.0%	60.5%	61.2%	62.7%	3.9%	4.5%	5.5%	17.4%	15.7%	14.8%
UN-PT	22.5	23.2	21.9	56.5	55.2	57.7	5.5	5.7	6.3	15.4	15.9	14.1
FY-PU	16.8	18.2	16.0	62.7	62.8	63.5	5.0	5.1	7.8	15.6	13.9	12.7
LA-NS	26.7	28.6	29.6	52.3	50.8	50.1	5.0	4.9	5.8	16.0	15.8	14.5
LA-R	25.8	26.4	28.0	49.7	49.5	50.4	5.2	5.9	6.7	19.3	18.4	15.0
JC-PU	21.0	23.0	24.8	63.0	62.2	59.2	3.0	3.6	4.9	12.9	11.1	11.1
JC-PT	27.2	27.0	30.9	47.4	48.9	43.9	5.2	6.5	7.4	20.1	17.5	17.9

Source: See Table 2-1 for data sources.

by class, offer the reader sufficient evidence of the inconsistency in the absolute value of component costs.

As educational operating costs change, it is possible that the four components change, at different rates or in disproportionate amounts. Table 2-11 indicates the linear relationship between educational operating expenses and each item or component

TABLE 2-11

SIMPLE LINEAR CORRELATION COEFFICIENTS BETWEEN EDUCATIONAL OPERATING EXPENDITURES WITH EACH OF THE FOUR COMPONENTS WHICH MAKE UP EDUCATIONAL EXPENDITURES BY TYPE AND CONTROL OF INSTITUTION, 1963-64, NORTHEAST REGION[a]

Type and Control of Institution	Correlation Coefficients Between EX 64 and			
	Administration R	Instruction R	Library R	Plant Operation R
UN-PU	.62	.91	.84	.72
UN-PT	.87	.95	.87	.87
FY-PU	.75	.89	.37	.69
LA-NS	.86	.95	.89	.72
LA-R	.81	.95	.58	.77
JC-PU	.81	.92	.48	.67
JC-PT	.81	.95	.60	.67

Source: See Table 2-2.

[a]This table indicates the relationship between educational operating expenses and each of the four items or components which make up educational operating expenses.

which makes up educational operating expenses. It is intended to illustrate which of the components change as changes in educational operating costs occur. A strong relationship means that changes in

that component match changes in educational operating costs. Evidence in Table 2-10 indicates that instructional costs most closely match changes in educational operating expenses. This implies that changes in faculty wages, which make up over eighty percent of instructional costs, have a great influence on educational operating costs. The other three components of educational operating expenses also have a strong relationship to educational operating costs but not to the degree of the instruction component. Library costs generally have the weakest relationship. There is also some evidence that when low expenditure institutions are faced with a shortage of funds, administrative costs are most likely to be cut.

The distribution of component costs will be discussed more extensively in Chapter 4.

SUMMARY

Several questions relating to the level of educational operating expenses per student were considered in this chapter, using institutional type and control as the unit of analysis.

The first section covered the relationship between the educational operating subsidy and net tuition with educational operating costs. Two ratios were used in the analysis; the return on net tuition in educational operating costs and educational operating to total current expenses. Data were primarily from Fiscal 1964, and to a lesser degree, Fiscal 1967. Somewhat consistent patterns in the class costs and ratios between Fiscal 1964 and 1967 data were observed. However, minimal consistency was noted, by class, within each year.

Perhaps the most interesting finding, and this was consistent over the two periods, by type of institution, is that the difference in net tuition receipts between public and private institutions is very similar to the difference in educational operating expenses per student (FTEE).

Public institutions, in both Fiscal years, and without exception, returned more to the student in educational resources for each net tuition dollar invested. However, the level of educational operating costs per student in public institutions was usually below that of its counterpart in the private sector.

In a sense, students have been getting educational resources in return for what they can afford to invest in net tuition. Over the Fiscal 1964 and 1967 periods, the amounts that students were expected to contribute to their education changed. Private schools, with the exception of universities, asked students to pay a larger share of their educational costs in Fiscal 1967. On the other hand, with the exception of universities, public institutions increased tuition but, at the same time, contributed more to educational operating expenses by increasing the operating subsidy per student. The first case exemplifies the "financial squeeze" on the private sector, while the second is an example of increased public support for higher education, from Fiscal 1964 to 1967.

Institutions within each class, for both periods, were found to spend a rather consistent proportion of total current expenditures on educational operations. Consistency in this ratio between classes and without regard to control was also observed for universities and privately controlled liberal arts colleges. Each of the three financial items and two ratios were reviewed by using a set interval analysis based on educational operating expenses. It was noted that the return to the student for each dollar of tuition invested (net tuition), in high expenditure institutions, was greater than in low expenditure schools. In some cases, students in high expenditure schools actually paid less in net tuition (in an absolute sense) than those in lower expenditure

institutions. This was due primarily to the level of the operating subsidy per student (FTEE), which was strongly related to educational operating expenditures/FTEE in all cases but one. High expenditure institutions appear to spend more on non-educational services since the ratio of educational operating expenditures to total current expenses fell when educational operating costs/FTEE rose. Further inquiry on the selectivity of an institution and the level of expenditures must be examined before the full impact of this analysis can be realized. That is the substance of the research reported in Chapter 3.

The effect of the staffing ratios on educational operating costs/FTEE was the second issue analyzed. And without doubt it was determined that the dominent variable in explaining differences in educational operating costs per student (FTEE) was the student-to-faculty ratio. While some variance in costs could be attributed to the number of Ph.D.'s on the staff and the number of administrators per student, the combined explained variance of these and the other two ratios, in all classes, did not match that of the student-to-faculty ratio by itself. However, there was a strong multiple relationship between the staffing ratios and educational operating expenditures/FTEE. The importance of this relationship, in explaining differences in educational operating costs per student (FTEE), is realized when recalling that over

75 percent of educational operating costs are allocated for professional wages. It was also determined that the use of part-time faculty, in all but religiously controlled liberal arts colleges, contributed to keeping educational operating costs per student (FTEE) low. An attempt was made, given the same set of staffing ratios, to determine whether institutions pay faculty approximately the same amount, by adjusting for the staffing ratios. Given the evidence and/or methodology, no conclusions were reached, although costs in junior colleges displayed some consistency.

Finally, over time and by institutional control, the relative amounts that institutions spend on the four components of educational operating expenses; administration, instruction, libraries, and plant operations, were reviewed and found to be highly consistent. Administrative costs did increase slightly while a decreasing percentage of funds was used for plant operations, although the absolute amounts used for plant operations increased, as did all costs. Notwithstanding the minimal movement in administrative and plant operating costs, this consistency in relative costs suggests that educational operating expenditures rise to meet the available funds, in an egalitarian manner. Furthermore, the strong one-to-one relationship between educational operating costs/FTEE and each of the components, particularly instruction, offers further support to this contention.

An important consequence of this latter finding which is manifested through the consistency in the relative share of component costs over the period of analysis, is that the relative position of all public and private institutions in supplying resources for the instructional function has remained constant.

Additional discussion will appear later with respect to the findings in this section as well as further development of the issues in Chapters 3 and 4, which adjust for the selectivity level of student and enrollment (FTEE).

CHAPTER 3

SELECTIVITY LEVEL OF STUDENTS AND RESOURCE ALLOCATIONS FOR EDUCATIONAL OPERATIONS

The analysis of financial and staff resources in institutions of higher education, by use of the traditional administrative breakdowns of type and control, was reported in Chapter 2. Differences in the selectivity level of students by institutions, within each class, was assumed to be a constant. However, this is not necessarily true. Table 3-1 indicates that the selectivity level of students has wide variation by class. With the exception of public institutions, there is a moderately wide dispersion of scores within each class. This suggests that there is a need for a more thorough analysis of educational operating expenditures/FTEE, with adjustments for the institutional selectivity level of students.

The Cass and Birnbaum classifications[1] will be used to indicate the selectivity level of students and are listed by the numerical designation attached to each:

1. Most selective
2. Highly selective

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[1] James Cass and Max Birnbaum, op. cit.

TABLE 3-1

DISTRIBUTION OF INSTITUTIONS BY RANGE OF SELECTIVITY LEVEL OF STUDENT, CASS AND BIRNBAUM 1964 RANKING, NORTHEAST REGION

Selectivity Level	Total	UN-PU	UN-PT	FY-PU	LA-NS	LA-R	JC-PU	JC-PT
1	16	0	8	0	8	0	NA	NA
2	24	0	7	1	13	3	NA	NA
3	67	7	6	3	19	30	NA	NA
4	67	3	6	18	9	31	NA	NA
5[a]	190	0	1	36	16	39	37	61
Total	362	10	28	58	65	103	37	61
Class mean		3.3	2.5	4.5	3.2	4.0	NA	NA

[a]Item 5 indicates those institutions for which no listing was available. It includes all junior colleges and a number of four-year institutions, most of which probably should be listed at five (5) on the level of student scale (item will then indicate no rating).

Source: James Cass and Max Birnbaum, Comparative Guide to American Colleges, Harper and Row, New York, 1966.

3. Very selective

4. Selective

5. Not listed.

Institutions in the "not listed" category include all junior colleges (see Table 3-1) as well as some exclusions in other classes and, as a result, the findings reported in this section will necessarily exclude junior colleges. Much of the analysis will concentrate on the private institutions, the reason being that there are

only ten public universities and the selectivity levels of students for 36 of the public four-year institutions were not available. Additionally, a special analysis of 43 non-sectarian and 55 religious-affiliated liberal arts colleges will be included. For this special analysis, the mean institutional score of the verbal section of the Scholastic Aptitude Test (VSAT)[1] will serve as the selectivity level of student.[2]

Results of the research will be reported in two sections, each of which will discuss one of two issues mentioned previously:

1. The relationship of educational operating expenditures with the operating subsidy and tuition by selectivity level of student.

2. The distribution of educational operating expenditure and the staffing ratios by selectivity level of student.

The Relationship of Educational Operating Expenses With the Operating Subsidy and Net Tuition by Selectivity Level of Student

The relationship between educational operating expenses per student (FTEE) and the selectivity level of student is clear

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[1]College Entrance Examination Board, Manual of Freshman Class Profiles (1965-66 Edition, New York)

[2]The VSAT is one of the items used to determine the selectivity factor by Cass and Birnbaum. It was calculated by Marston Case, now of Educational Testing Service (ETS) for an unpublished U.S. Office of Education working paper. This calculation was necessary because the available published institutional data was by range of student scores. The standard statistical technique for calculating

(Table 3-2). They are positively related in private universities, liberal arts colleges, and public four-year institutions, although

TABLE 3-2

SIMPLE LINEAR CORRELATION COEFFICIENTS BETWEEN EDUCATIONAL OPERATING EXPENDITURES, OPERATING SUBSIDY, AND THE LEVEL OF STUDENT (SELECTIVITY FACTOR)

Type and Control	EX 64 and Subsidy[a]	EX 64 and Level of Student[b]	Subsidy and Level of Student[b]
UN-PU	.70	.37	-.13
UN-PT	.97	-.78	-.73
FY-PU	.95	-.41	-.46
LA-NS	.88	-.58	-.46
LA-R	.88	-.06	.14
JC-PU	.54	---	---
JC-PT	.78	---	---

[a]EX 64--Educational Operating Expenses per student (FTEE)
Subsidy--E ducational Operating Subsidy per student (FTEE)

[b]The most selective institutions are designated as having a value of one (1), therefore a negative correlation coefficient suggests that educational operating expenses or the operating subsidy per student are higher in the more selective institution.

Source: U.S. Department of Health, Education, and Welfare, Office of Education, "Higher Education General Information Survey," Fiscal Year 1964 and 1967, unpublished data. See also Table 3-1.

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the mean of grouped data was used. Institutions were not identified by name, in continuing the pledge of confidentiality.

to a lesser degree in the latter group. The implication of this positive activity is that students at higher ability levels have more abundant educational resources. Coinciding with this relationship in all three classes is one between the operating subsidy per student (FTEE) and the selectivity level of student. Institutions in the other classes do not exhibit these relationships, although all institutions have strong one-to-one relationships between educational operating expenses and operating subsidy. The low measures of correlation between educational operating expenses and the selectivity level of students in public universities and religiously controlled liberal arts colleges indicates that students are attracted to these institutions for reasons other than educational resources.

Educational operating expenses per student are strongly related, on a one-to-one basis, to both the level of student and the operating subsidy. The question arises, which of the two variables has the most influence on variations in costs: institutional wealth as suggested by the operating subsidy or student wealth as indicated by the level of student? Table 3-3 reports the results of a multiple correlation analysis. It clearly illustrates in all classes that the institution's wealth, as suggested by the operating subsidy, is by a large margin the more important of the two variables in explaining the variation in educational operating expenses per student. The implication of this finding is that if

TABLE 3-3

MULTIPLE LINEAR CORRELATION COEFFICIENTS AND THE MARGINAL CONTRIBUTION TO VARIATION OF EDUCATIONAL OPERATING EXPENDITURES WITH THE OPERATING SUBSIDY AND LEVEL OF STUDENT (SELECTIVITY FACTOR)

Type and Control	Multiple Regression Analysis[a]			
	Correlation Coefficient	Variance	Marginal R^2 for:[b] Level of Student	Operating Subsidy
UN-PU	.85	.72	.23[c]	.58[c]
UN-PT	.98	.95	.01[c]	.35[c]
FY-PU	.95	.90	.00	.74[c]
LA-NS	.90	.80	.04	.47[c]
LA-R	.90	.80	.04[c]	.80[c]
JC-PU	---	---	---	---
JC-PT	---	---	---	---

[a]Educational operating expenses per student (dependent variable) is a function of the selectivity level of student and the operating subsidy per student (independent variables)

[b]The Marginal R^2 is the difference in the variance (Col. 2) when the indicated variable is dropped from the multiple regression analysis.

[c]Regression coefficients significant at .95 level or greater.

Source: See Table 3-2 for data sources.

institutions are to attract students of higher ability levels they must be willing and able to subsidize a large part of the cost of the educational or instructional function. To determine the validity of this assumption a set interval analysis, based on the selectivity

level of student, was compiled for the fiscal years 1964 and 1967 (Tables 3-4 and 3-5).

TABLE 3-4

SET INTERVAL ANALYSIS BASED ON THE SELECTIVITY LEVEL OF STUDENT FOR SELECTED FINANCIAL ITEMS BY TYPE AND CONTROL OF INSTITUTION, NORTHEAST REGION, 1963-64

Selectivity Level of Student [a]	No. of Institutions	Educational Operating Costs/FTEE [b]		Educational Operating Subsidy		Net Tuition	Ex 64/ Net Tuition	Ex 64/Total Current Expenses	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	$\bar{X}$	$\bar{X}$	CV
Universities--Public									
3	7	$1,402	17	$1,102	15	$ 300	$ 4.70	.56	26
4	3	1,627	18	1,207	19	420	3.87	.59	8
Universities--Private									
1	8	3,228	20	2,285	36	943	3.42	.44	10
2	7	2,054	36	997	81	1,057	1.94	.55	15
3	6	1,977	21	782	52	1,195	1.65	.54	10
4	6	1,175	22	272	81	903	1.30	.72	12
Four Year--Public									
3	3	1,298	9	1,182	14	116	11.19	.80	9
4	18	931	32	769	44	162	5.75	.75	12
5	36	892	28	654	43	238	3.75	.74	12

TABLE 3-4 (Continued)

Selectivity Level of Student[a]	No. of Institutions	Educational Operating Costs/FTEE[b]		Educational Operating Subsidy		Net Tuition	Ex 64/ Net Tuition	Ex 64/Total Current Expenses	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	$\bar{X}$	$\bar{X}$	CV
Liberal Arts--Non-Sectarian									
1	8	$2,560	38	$1,487	64	$1,073	$ 2.39	.63	10
2	13	2,246	27	920	62	1,326	1.69	.64	8
3	19	1,753	30	513	106	1,240	1.41	.63	11
4	9	1,186	24	276	70	910	1.30	.67	17
5	16	1,363	37	447	92	916	1.49	.71	15
Liberal Arts--Religious									
2	3	1,574	32	553	48	1,021	1.54	.62	16
3	30	1,263	24	368	67	895	1.41	.66	12
4	31	1,143	34	362	88	817	1.40	.69	14
5	39	1,236	52	558	139	678	1.82	.67	15

[a]All values for each class are sorted by the selectivity factor and values calculated as indicated where $\bar{X}$ refers to mean value; CV refers to the coefficient of variation.

[b]See notes [a] and [b] in Table 2-1 for interpretation of selected financial items.

Source: See Table 3-1 and 3-2 for data sources.

Included in the set interval analysis, in addition to educational operating and operating subsidy per student, are: net tuition, the return on net tuition in educational operating expenses, and the ratio of educational operating to total current expenses, all items used in Chapter 2.

TABLE 3-5

SET INTERVAL ANALYSIS ON THE SELECTIVITY LEVEL OF STUDENT FOR SELECTED FINANCIAL ITEMS BY TYPE AND CONTROL OF INSTITUTION, NORTHEAST REGION, 1966-7

Selectivity Level of Student[a]	No. of Institutions	Educational Operating Costs/FTEE[b]		Educational Operating Subsidy[b]	Net Tuition		EX 64/ Net Tuition	Ex 64/Tot. Current Expenses	
		$\bar{X}$	CV	$\bar{X}$	$\bar{X}$	CV	$\bar{X}$	$\bar{X}$	CV
Universities--Public									
3	7	$1,682	15	$1,303	$ 379	57	$4.44	.55	28
4	2	2,044	13	1,440	604	48	3.38	.57	2
Universities--Private									
1	10	4,163	25	3,062	1,001	25	4.12	.41	23
2	7	2,314	30	1,023	1,291	23	1.79	.48	27
3	4	1,964	25	509	1,455	15	1.35	.61	20
4	7	1,236	23	194	1,042	28	1.19	.70	14
Four Year--Public									
3	3	1,502	42	1,350	152	17	9.88	.75	12
4	29	1,155	30	907	248	65	4.66	.74	12
5	23	1,200	21	918	282	41	4.26	.72	21
Liberal Arts--Non-Sectarian									
1	11	3,197	23	1,779	1,418	21	2.25	.59	6
2	21	2,271	26	734	1,537	18	1.48	.60	14
3	11	1,790	43	416	1,374	29	1.30	.57	20
4	16	1,491	33	80	1,411	30	1.06	.64	15
5	12	1,436	35	286	1,150	44	1.25	.65	15

TABLE 3-5 (Continued)

Selectivity Level of Student[a]	No. of Institutions	Educational Operating Costs/FTEE[b]		Educational Operating Subsidy[b]	Net Tuition		EX 64/ Net Tuition	EX 64/Tot. Current Expenses	
		$\bar{X}$	CV	$\bar{X}$	$\bar{X}$	CV	$\bar{X}$	$\bar{X}$	CV
Liberal Arts--Religious									
2	4	$1,781	17	$ 521	1,260	11	$1.41	.60	12
3	33	1,478	26	295	1,183	18	1.25	.63	14
4	39	1,166	20	202	964	23	1.21	.62	14
5	30	1,381	42	617	764	85	1.81	.68	21

[a]See note[a], Table 3-4

[b]See notes [a] and [b], Table 2-1, for interpretation of selected financial items.

Source: See Table 3-1 and 3-2 for data sources.

Generally, the movement of educational operating expenses and the operating subsidy, in the set interval analysis, is consistent by class with the previous discussion for both Fiscal 1964 and 1967. That is, as the level of student improves, educational operating expenses and the operating subsidy per student increase in all classes but public universities. In both fiscal years, it was observed that about 90 percent of the institutions in selectivity levels one and two are under private control. Variation measures were consistent between years and, except for the operating subsidy, strong in all classes and by selectivity level.

Further inspection of the number of institutions in each set interval for Fiscal 1967 compared with Fiscal 1964 indicates a significant change in the distribution of institutions by set interval. More specifically, 49 institutions shifted upward to a higher selectivity level of student in Fiscal 1967. Comparisons of educational operating expenses per student (FTEE) by set interval for Fiscal 1964 and 1967, with full adjustment for price changes, indicates that the mean set interval educational operating cost per student fell in 5 out of the 15 sets. On an individual basis, 24 institutions had lower costs. Despite the shifting of institutions from one selectivity level to another, and lower mean set interval educational operating costs per student, the more selective institutions (levels one and two) continued to return more in educational operating expense dollars to their students for each net tuition dollar.[1] The shifting by an institution into a higher selectivity level, without increasing educational operating resources, is to a great extent a reflection of the functioning of the market system. It is common knowledge that the demand for higher education has increased dramatically in recent years. This has, in a sense, allowed some institutions to attract the same or more able students without offering additional educational resources.

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[1]Net tuition used in Fiscal 1964 is a derived figure, while actual values were used for Fiscal 1967. All data were collected from the same sources and findings were consistent. The operating subsidy in Table 3-5 was derived. It is equal to educational operating expenses per student less (-) net tuition per student and is consistent with earlier findings.

Tuition and Institutional Selectivity

The relationship between level of student and net tuition (gross tuition less student aid), in both 1963-4 and 1966-7, was not linear. In the two most selective classes of institutions, private universities and non-sectarian liberal arts colleges, net tuition was lower in dollar value for institutions in level one than for those in levels two and three except in one instance. Equally important, students in the level one group received more in educational operating expenses for each tuition dollar invested. This pattern of providing a greater return in operating resources in the more selective institutions was manifest in all but one instance. The higher return in educational resources per dollar of tuition was possible primarily because of the operating subsidy, a reflection of institutional wealth. In fact, the operating subsidy in each class of institution was highest in the most selective group.

From these observations it is evident that institutions in two classes,private universities and non-sectarian liberal arts colleges, practice some form of price discrimination. That is, an institution advertises at one price (gross tuition), but through its student aid program it actually sells admission to the institution to different students at different prices. For example, level one schools in both of these classes had an average advertised

gross tuition of $1,600 in 1963-64 and $1,870 in 1966-67.[1] However, in private universities, net tuition per student was actually less than $950 in 1963-64 and around $1,000 in 1966-67 (Tables 3-4 and 3-5). The net price in non-sectarian liberal arts colleges was $1,095 in 1963-4 and $1400 in 1966-7. Gross tuition in level three schools, in both classes, was outwardly competitive at $1,350 in 1963-4 and $1,600 in 1966-7, but students actually paid an average of $1,200 in 1963-4 and $1,450 in 1966-7 in the universities and $1,250 in 1963-4 and $1,375 in the non-sectarian liberal arts institutions (Tables 3-4 and 3-5).

Furthermore, students who attended the less selective institutions in all classes of private institutions received less for their tuition dollar than students attending institutions in the more selective sets. Further comment on tuition will be made in the special analysis which follows this section.

The distribution of educational operating expenditures per student (FTEE) within each set interval was minimal, according to the coefficient of variation in both 1963-4 and 1966-7. Variation was less in the more selective institutions for almost all items. Wide variation in the sbusidy in 1963-4 was also greater in the less selective institutions, suggesting a wide distribution in net tuition.

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[1] Gross tuition for Fiscal 1964 and 1967 was taken from Life Insurance Agency Management Association, College Costs, 1963-64 and 1966-67 (Hartford, Connecticut, 1963).

One of the more important findings in Chapter 2 indicated that institutions, by class, spend a fairly consistent share of total current expenditures on educational operations. The same results, again with small variation, were found by class and selectivity factor. The ratio of educational to total expenses increased from level one to level four in all cases except four-year public colleges. This suggests that not only do students in level one have more educational resources available, but level one institutions spend more on non-educational services. This may, as noted above, increase the return on tuition investment to a greater degree since many non-educational services also provide additional academic experiences.

Special Analysis of Gross Tuition and Educational Operating Expenditures for Selected Private Liberal Arts Colleges.

A special analysis was undertaken to supplement the information on gross tuition and educational operating expenses. As a reliability check, educational operating costs/FTEE for the special analysis and for the main study were compared (Tables 2-1 and 3-6) and found to be consistent. In fact, the measures of variation were smaller for the special case values.

From the analysis, it was observed that in religiously controlled institutions, educational operating expenses/FTEE were more highly correlated on a one-to-one basis with gross tuition than with the Verbal Scholastic Aptitude Test

TABLE 3-6

MEAN VALUE FOR EDUCATIONAL OPERATING EXPENSES, TUITION, AND MEAN VERBAL SAT SCORES FOR 55 RELIGIOUS AND 43 NON-SECTARIAN LIBERAL ARTS INSTITUTIONS, NORTHEAST REGION, 1963-4.

	EX 64/FTEE		Gross Tuition		VSAT[a]	
	$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	CV
Non-Sectarian	$1,883	35	$1,494	30	$576	10
Religious	1,212	30	$1,094	22	532	7

[a]The Verbal Scholastic Apptitude Test Score (VSAT) is one of the items used to determine the selectivity factor and will be used as a substitute for the selectivity measure in this table.

Source: U.S. Office of Education, Office of Program Planning and Evaluation, Unpublished study, June 1968

TABLE 3-7

CORRELATION COEFFICIENTS FOR EDUCATIONAL OPERATING EXPENSES, TUITION, AND MEAN VERBAL SAT SCORES FOR 55 RELIGIOUS AND 43 NON-SECTARIAN LIBERAL ARTS INSTITUTIONS, NORTHEAST REGION, 1963-4

	Religious			Non-sectarian		
	EX 64 /FTEE	Gross Tuition	VSAT	EX 64 /FTEE	Gross Tuition	VSAT
EX 64[b]	1.00	.62	.51	1.00	.53	.75
Gross Tuition		1.00	.65		1.00	.53
VSAT[a]			1.00			1.00

[a]See note [a], Table 3-6.

[b]EX 64--Educational Operating Expenses per student (FTEE).

Source: See Table 3-6, above, for sources of data.

(VSAT) score. The opposite, however, was true in the non-sectarian institutions. Additionally, when the same set of items was correlated (Table 3-8) using multiple correlations, the same pattern was evident. In the non-sectarian controlled institutions the VSAT score contributed 31 percent of the variance compared to 3 percent in the religiously controlled institutions.

TABLE 3-8

MULTIPLE CORRELATION COEFFICIENT, VARIANCE, AND MARGINAL CONTRIBUTION TO EXPLAINED VARIANCE IN EDUCATIONAL OPERATING EXPENSES OF GROSS TUITION AND VERBAL SAT SCORE, FOR 55 RELIGIOUS AND 43 NON-SECTARIAN LIBERAL ARTS COLLEGES NORTHEAST REGION, 1963-4[a]

Control	Correlation Coefficient (R)	Variance (R^2)	Marginal R^2 for:[b]			
			VSAT	t[c]	Gross Tuition	t[c]
Non-sectarian	.76	.58	.31	.01	.2	N
Religious	.64	.41	.03	N	15.0	.01

[a]Educational operating expenses per student (EX 64) are a function of verbal scholastic aptitude test (VSAT) and gross tuition.

[b]The Marginal R^2 is the difference in the variance (Col. 2) when the indicated variable is dropped from the multiple regression analysis.

[c]Each regression coefficient was tested, using the Student's "t" Test, N means t value fails .10 two tail test.

Source: See Table 3-6 for source of data.

Gross tuition, on the other hand, accounted for 15 percent of the variance in religiously controlled colleges, compared with 2 percent in the non-sectarian set. It should be noted that multiple correlation coefficients were high; .76 for non-sectarian and .64 for religiously controlled institutions. In reviewing these observations it becomes clear that in religiously controlled institutions there is a high dependence upon tuition income to meet educational operating expenditures. In the non-sectarian institutions, educational operating expenses/FTEE were highly correlated with the VSAT scores, which coincides with the finding in the main study.

Gross tuition was analyzed (Table 3-9) as a function of educational costs/FTEE and VSAT with similar results. The correlation in the non-sectarian institutions was moderately high but neither of the two variables had a substantial marginal contribution to the differences in tuition. The opposite was true for the religiously affiliated schools where each value contributed equally (12 percent) to the variation.

Finally, a set interval summary, based on the VSAT interval, is reported in Table 3-10, but without the benefit of variation measures. The coefficient of variation was available for the summary data in each class and was within acceptable levels for gross tuition and educational operating expenses/FTEE; both were smaller than the measure for VSAT.

TABLE 3-9

MULTIPLE CORRELATION COEFFICIENT, VARIANCE, AND PERCENT MARGINAL CONTRIBUTION TO EXPLAINED VARIANCE OF GROSS TUITION WITH EDUCATIONAL OPERATING EXPENSES AND VERBAL SAT SCORE FOR 55 RELIGIOUS AND 43 NON-SECTARIAN LIBERAL ARTS COLLEGES, NORTHEAST REGION, 1963-64[a]

Control	Correlation Coefficient (R)	Variance (R^2)	Marginal R^2 for:[b]			
			VSAT	t	EX 64	t
Non-Sectarian	.57	.31	.04	N[c]	.04	N[c]
Religious	.71	.50	.12	.01	.12	.01

[a]Gross tuition is a function of educational operating expenses per student (FTEE) and the verbal scholastic aptitude test (VSAT).

[b]The Marginal R^2 is the difference in the variance (Col. 2) when the indicated variable is dropped from the multiple regression analysis.

[c]Each regression coefficient was tested, using the Student's "t". N means t value. Was not significant at the .90 level.

Source: See Table 3-6 for source of data.

In the set intervals by group, with slight variation, trends in values coincided with the findings in the set interval analysis, sorted by level of student and discussed earlier. For both the non-sectarian and religious institutions, the higher the VSAT score the higher the level of educational operating expenses and gross tuition per student (FTEE). Further, the ratio of the two, educational operating expenses to gross tuition, also increased

TABLE 3-10

A SET INTERVAL ANALYSIS BASED ON MEAN VSAT SCORES FOR MEAN VALUES OF GROSS TUITION AND EDUCATIONAL OPERATING EXPENDITURE, FALL 1964, FOR SELECTED NORTHEAST REGION LIBERAL ARTS COLLEGES

VSAT Interval	No. of Schools	VSAT[a]	Gross Tuition	EX 64/ FTEE[a]	EX 64/Gross Tuition
Non-Sectarian Control					
450-500	6	479	$1,137	$1,215	$1.07
501-550	7	529	1,304	1,407	1.08
551-600	17	581	1,534	1,738	1.13
601-650	10	622	1,611	2,615	1.62
Over 650	3	693	2,037	2,708	1.33
All	43	576	1,494	1,883	1.26
(C.V.)[b]		(95)	(30)	(35)	(NA)
Religious Control					
450-500	11	482	944	1,092	1.16
501-550	29	514	1,049	1,067	1.02
551-600	13	573	1,229	1,397	1.14
601-650	1	629	1,700	2,025	1.19
Over 650	1	655	1,700	2,467	1.45
All	55	532	1,094	1,193	1.09
(C.V.)[b]		(75)	(22)	(34)	(NA)

[a]EX 64--Educational operating expenses per student (FTEE)
VSAT--Verbal scholastic aptitude test.

[b]Coefficient of variation (CV) available for totals only.

Source: College Entrance Examination Board, Manual of Freshman Class Profiles (1965-66 Edition, New York)
See table 3-2 for other data sources.

with rises in VSAT. It is interesting to note that for those institutions with the same mean VSAT score in each group, there is a substantial difference in educational operating expenses per student and gross tuition, although the ratios are not very far apart. Of course, unless the educational operating cost to net tuition ratio is considered with adjustments for student aid, as in Tables 3-3 and 3-4, the true expense-tuition relationships are not evident. Unfortunately, student aid data were not used for this particular analysis.

As this section closes, it becomes clear that student academic wealth is attracted to those institutions which not only can provide more current educational resources per student, but also, through scholarship aid, reduce net tuition. More selective institutions also grant a greater return in educational operating expenses for the tuition dollar than less selective institutions. They also appear less dependent on tuition to determine the level of educational operating expenditures for the fiscal year studied (1964). This was particularly obvious in the special analysis of private non-sectarian schools. In religiously-controlled liberal arts institutions, only three of which were in selectivity level of student one or two, net tuition was found to be significant in contributing to the variance in the level of educational operating expenditures/FTEE in contrast to the non-sectarian controlled schools, which appear to depend more on other income.

The Distribution of Staffing Ratios by Selectivity Level of Students

It has already been established in the previous chapter that the staffing ratios used in this study are strongly correlated with the level of educational operating expenses per student (FTEE). Multiple correlation coefficients, for the four year institutions and universities, ranged from .64 to .84 (Table 2-5). It has also been established in another section of this chapter that educational operating expenses per student (FTEE) are higher in the more selective institutions, regardless of type and control. It should follow then that the staffing ratios improve, the more selective the institution. This is indeed the case and can be observed in a set interval analysis (Table 3-11). Staffing ratios were sorted by selectivity level of student. Universities, in part, reflecting large graduate student enrollments, had lower students-to-faculty ratios and lower full-time-to-total faculty ratios compared with four-year institutions. They also had higher students-to-student personnel staff ratios, a reflection perhaps of the depersonalized nature of large institutions. Lastly, the student-to-administrator ratio in universities is higher, but this may be a reflection of economies of scale. Four-year non-sectarian institutions had the highest Ph.D. decile rankings, followed by public universities, private universities, public four-year colleges, and four year religious controlled institutions. Variation measures

TABLE 3-11

SETS OF MEANS AND COEFFICIENTS OF VARIATION FOR SELECTED STAFFING AND OTHER RATIOS BY LEVEL OF STUDENT, AND TYPE AND CONTROL OF INSTITUTION, NORTHEAST REGION, 1963-64

Level of Student[a]	No. of Schools	FTEF/ Total[b]		Ph.D. Decile		FTEE/ FTEF		FTEE/ Admin.		FTEE/ SPS	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
Universities--Public											
3	7	.68	24	6.7	22	13.3	11	324	57	225	59
4	3	.75	20	4.7	73	12.2	22	244	57	193	40
Universities--Private											
1	8	.72	17	6.3	44	8.2	41	89	56	155	45
2	7	.72	9	5.8	59	11.6	12	271	75	266	62
3	6	.66	12	6.3	28	11.3	17	217	47	212	55
4	6	.68	13	4.0	51	14.3	22	331	35	305	37
5	1	.57	0	1.0	0	18.9	0	156	0	229	0
Four Year--Public											
2	1	.93	0	7.0	0	8.6	0	150	0	100	0
3	3	.69	32	5.7	51	18.8	19	263	33	159	7
4	18	.80	12	5.0	53	17.8	18	302	64	385	111
5	36	.80	22	3.8	70	19.2	19	236	48	243	60
Liberal Arts--Non-Sectarian											
1	8	.80	12	7.0	42	12.9	77	87	47	108	68
2	13	.86	9	7.9	24	10.8	24	77	32	130	86
3	19	.81	13	7.2	28	12.8	25	73	42	127	73
4	9	.82	12	4.7	57	16.8	15	94	35	236	90
5	16	.72	26	4.9	51	15.3	37	109	103	381	150

TABLE 3-11 (Continued)

Level of Student[a]	No. of Schools	FTEF/ Total[b]		Ph.D. Decile		FTEE/ FTEF		FTEE/ Admin.		FTEE/ SPS	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
Liberal Arts--Religious											
2	3	.75	4	6.3	7	12.0	11	79	46	60	0
3	30	.80	15	5.3	41	14.0	27	92	54	124	70
4	31	.73	23	3.7	48	15.0	25	91	49	150	76
5	39	.76	16	2.9	65	14.0	35	82	58	147	87

[a]See note [a] in Table 3-4.

[b]See note [a] in Table 2-3 for interpretation of staffing ratios.

Source: See Table 3-1 and 3-2 for source of data.

for all classes were strong to moderate for all ratios except the student-to-administration and student-to-student personnel staff ratios, which had moderate to weak measures.

Further review of Table 3-11 reveals that, within each class, the more selective institutions have better prepared and greater numbers of available faculty. Ph.D. deciles improved by at least two in all but public universities, from the least to the most selective classes. The staffing ratios for faculty, administrators, and student personnel staff, in all but public universities, improve from 30 percent to over 100 percent in the most selective

sets of institutions. Finally, the more selective institutions have greater numbers of full-time staff members.

In any case, a question remains: how does the availability of resources compare, by class, and the selectivity level of students? At selectivity level 3, for example (Table 3-12), students can expect varying amounts of staff resources, depending on

TABLE 3-12

A COMPARISON OF STAFFING RATIOS FOR SELECTIVITY LEVEL OF STUDENTS THREE, BY CLASS, NORTHEAST REGION INSTITUTIONS, 1963-4

Class	Number of schools in selectivity level 3	FT/ Total[a]	Ph.D. Decile	FTEE/ FTEF	FTEE/ Admin.	FTEE/ SPS
UN-PU	7	.68	6.7	13.3	324	225
UN-PT	6	.66	6.3	11.3	217	212
FY-PU	3	.69	5.7	18.8	263	159
LA-NS	19	.81	7.2	12.8	73	127
LA-R	30	.80	5.3	14.0	92	124

[a]See Table 2-3 for interpretation of staffing ratios.

Source: Table 3-10.

the type and control of institution. Specifically, 81 percent of the faculty were full-time employees in the four-year liberal arts colleges, compared with 80 and 69 percent respectively in religiously and public controlled four-year colleges. In the latter two

two classes of institutions, Ph.D. deciles averaged 5.3 and 5.7 respectively, compared with 7.2 in the former class. Similar patterns exist in the student-to-faculty, student-to-administrator, and student-to-student personnel staff ratios; more staff members are available per student in the non-sectarian liberal arts colleges, compared with the other two classes of four-year institutions. Private universities, as contrasted to public universities, provided greater numbers of staff per student at selectivity level three, but had fewer full-time and Ph.D. holding faculty members. Corresponding differences can be observed in the other set intervals for each class of institution.

SUMMARY

In this chapter, the relationship between educational operating expenses per student (FTEE) with the operating subsidy, net tuition, the selectivity level of students, and the staffing ratios were analyzed with these results. First, 90 percent of the highly selective institutions (levels one and two) were private universities or non-sectarian controlled liberal arts colleges. These institutions expended more on educational operating costs and had lower educational operating to total cost ratios than institutions in all other levels and classes. Students in these institutions had more and better prepared staff at their service. Furthermore, privately controlled institutions with the highest selectivity levels (one) charged their students less in net tuition than students in other selectivity levels. That is, gross tuition, the price indicated in the college catalog, was reduced by rather large amounts of student aid. In order to attract the highest level students, these institutions offer students discounts on the listed prices and, in a sense, it is suggested, practice a form of price discrimination.

It appears that those students with the highest entering level of ability were selected by (and themselves chose) institutions which provided them with the greatest absolute and relative amounts of educational resources for their net tuition dollar.

Evidence of this process of mutual selectivity appeared in the analysis of 1963-64 and 1966-67. However, many students in 1966-67, at the same selectivity level as students in 1963-64, could not expect to receive as high a return on their educational investment, since fewer dollars were spent on educational operating expenses per dollar of net tuition. One reason for this was the greater competition for spaces in schools due to the increasing enrollments of recent years. The fall in the ratio also implies that students paid a larger share of their educational operating costs per student in Fiscal 1967.

The importance of tuition payments in determining the level of educational operating expenditures is mixed. In public institutions and in the highly selective privately controlled schools, the determining factor appears to be institutional wealth and other income (the operating subsidy). In all other private institutions, tuition payments play a much more significant role in determining the level of expenditures. This may be seen by comparing the differences in the ratio of operating expenditures to net tuition (Tables 3-4 and 3-5). A number of institutions spend little more on the instructional function than tuition collections.

A special analysis of liberal arts colleges also indicated the strong relationship between gross tuition and educational operating expenditures in the less affluent religiously controlled

institutions and between the operating subsidy and educational operating expenditures in non-sectarian schools.

Analysis of staffing ratios, with adjustment for the level of student, produced much the same pattern with respect to the operating subsidy and net tuition. More and better prepared faculty were available in institutions at higher levels of selectivity, although students at the same level of selectivity between classes could not expect to receive the same quality of institutional resources, such as the operating subsidy and staffing ratios.

One final comment is appropriate regarding costs and the staffing ratios in the private sector. Generally, it can be affirmed that the return on net tuition in educational operating expenses was greater in the more selective sets of institutions. This same truth applies to educational operating expenses per student and the size and preparedness (Ph.D.) of the faculty. Conversely, the net tuition paid was lower in most set intervals, regardless of class, and excluding religiously controlled liberal arts colleges.

The final chapter will contain a more thorough analysis of the accumulation of wealth in selected groups of institutions and the differences in wealth among selective sets of institutions.

CHAPTER 4

THE EFFECT OF ENROLLMENT SIZE AND DISTRIBUTION ON RESOURCE ALLOCATIONS FOR EDUCATIONAL OPERATIONS

This chapter is concerned with the effect of enrollment on resource allocations in colleges and universities. Implied in this broad issue are three of the most pressing economic questions facing higher education today; namely:

1. What effect does variation in the enrollment mix have on educational operating expenses when the enrollment mix includes the percentage of male students, percentage of graduate students, percentage of full-time students, the selectivity level of students, and number of full-time equivalent students?
2. Considering variations in the size of the full-time equivalent enrollment, are there levels of enrollment for which educational operating expenditures per student are generally lower? In economic terminology, this question reads: do institutions of higher education exhibit economies of scale, given full-time equivalent enrollment as the measure of output?

3. Considering the recent past and present trends in college attendance, and the resulting growth requirement, is there a rate of enrollment growth which appears more desirable in terms of the growth of total educational operating expenses?

Research undertaken in an attempt to determine the answers to these questions is reported in three sections, one for each question posed. Methodology, in most cases, is similar to that used in the previous chapters. In those instances where new techniques are used, explanations will be offered. In lieu of a chapter summary, because of the length of this chapter, summaries will follow each of the three sections.

The Enrollment Mix and Educational Operating Expenses

Consideration of the enrollment mix, as it relates to the level of educational operating expenses per student FTEE, is the basis of research in this section. For this study, the enrollment mix will include: the percentage of male, graduate, and full-time students; the selectivity level of students; and the number of full-time equivalent students (FTEE). Mean class values, multiple correlation analysis, and set interval analysis are used in the data analysis to determine which of these values affect the level of educational operating costs per student (FTEE).

Mixed patterns were observed in the mean class values for the enrollment mix, by type and control of institution (Table 4-1). For example, values for both public and private universities were fairly

TABLE 4-1

ENROLLMENT MIX PATTERNS AND CHARACTERISTICS FOR HIGHER EDUCATION INSTITUTIONS, BY TYPE AND CONTROL, 1963-4, NORTHEAST REGION[a]

No.	Type and Control	LS		FTEE		FT/Total		Males/ Total		Grad/ Total[b]	
		$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
10	UN-PU	3.3	15	10673	56	.70	30	.62	18	.15	40
28	UN-PT	2.5	48	8443	63	.67	30	.76	20	.31	45
58	FY-PU	4.5	16	2590	97	.73	26	.42	24	.10	120
65	LA-NS	3.2	41	1472	107	.84	25	.51	67	.06	183
103	LA-R	4.0	23	936	72	.73	32	.31	116	.03	233
37	JC-PU	NA[b]		1286	74	.60	43	.67	34	.00	0
61	JC-PT	NA[b]		328	129	.81	30	.33	124	.00	0

[a]Data includes the class mean ($\bar{X}$) and the coefficient of variation (CV). NA means data not available.

[b]To understand the table mean values ($\bar{X}$) for public universities may be interpreted as follows:

LS--The selectivity level of students is 3.3
FTEE--The number of full-time equivalent students is 10,673
FT/Total--The full-time to total students ratio is .70
Males/Total--The male to total students ratio is .62
Grad/Total--The graduate to total students ratio is .15

Sources: James Cass and Max Birnbaum, Comparative Guide to American Colleges, Harper and Row, New York, 1966.

U.S. Department of Health, Education, and Welfare, Office of Education, Survey of Financial Statistics of Institutions of Higher Education, unpublished data

_____, Opening Fall Enrollment, 1963, U.S. Government Printing Office, Washington, D.C.

consistent when compared with values for four-year institutions. Universities, as a group, also had higher selectivity levels of students; more students (FTEE) but fewer full-time students. They also had more male and more graduate students than the four-year institutions. Two-year institutions differed widely by control. Modest comparisons were possible between private two-year and religious four-year institutions since the full-time and male to total students ratios were similar. Public institutions, by class, had lower selectivity levels of students and more full-time equivalent students (FTEE) than private institutions. Comparisons of other enrollment mix items varied, depending on the type of institution.

Going beyond observation of class means for each item in the enrollment mix, is the multiple relationship of each item with educational operating expenses per student and the unique contribution of each to the total explained variation. A strong relationship between the enrollment mix and educational operating costs per student (FTEE) is manifested in the value of the multiple correlation coefficient of public universities, four-year colleges, private universities and non-sectarian controlled four-year institutions (Table 4-2). Values ranged from .60 to .92. In the other three classes, public two-year colleges, private two-year colleges, and religiously controlled four-year colleges, moderate to weak relationships were observed as values ranged from .36 to .42. It is also clear that the unique contribution of each item in the enrollment mix differs by type and control. In public institutions,

TABLE 4-2

CORRELATION BETWEEN EDUCATIONAL OPERATING EXPENSES AND ENROLLMENT MIX AND THE MARGINAL R^2 CONTRIBUTION OF EACH FACTOR FOR NORTHEAST REGION INSTITUTIONS OF HIGHER EDUCATION, 1963-4.

Type and Control	No.	Multiple Correlation Coefficient R	Variance R^2	Marginal R^2 for:[a]				
				FTEE	L.S.	FT/ Total	Male/ Total	Grad/ Total
UN-PU	10	.92	.84	.42	.48	.57	.00	.04
UN-PT	28	.84	.71	.00	.05	.02	.03	.05
FY-PU	58	.60	.36	.05	.19	.10	.05	.01
LA-NS	65	.70	.49	.01	.15	.08	.00	.07
LA-R	103	.42	.18	.11	.02	.03	.00	.00
JC-PU	37	.39	.15	.00	NA	.09	.03	-
JC-PT	61	.36	.13	.12	NA	.00	.00	

[a]See Table 4-1 for interpretation of enrollment mix variables.

Source: U.S. Department of Health, Education, and Welfare, Office of Education, Higher Education General Information Survey, Fiscal Year 1964, Unpublished data.

full-time students contributed more to the explained variance than in the private sector. The opposite was true for graduate students in the private sector when compared to the public institutions. Disregarding public universities, which had distorted results affected by the small number of institutions, the selectivity level of student account for the greatest amount of the explained variance in private universities and four-year institutions under public and non-sectarian control. In religiously controlled four-year colleges and private junior colleges,

changes in enrollment (FTEE) contributed chiefly to the explained variance in educational operating costs. Interestingly enough, more than half of the privately controlled junior colleges are under religious control. In all but two classes, public universities and four-year colleges, the unique contribution to the variance of individual variables was rather small in comparison to the total explained variance (R^2). This suggests a high degree of intercorrelation among the items in the enrollment mix.

Table 4-3 illustrates the beta coefficients for the multiple regression equation between educational operating expenses per student (dependent variable) and each item in the enrollment mix (independent variables). The value of the beta coefficient in a multiple regression equation can be thought of as the amount the dependent variable changes with a unit change in the independent variable, while holding all other variables constant. Referring again to Table 4-3, it is detected that in all public institutions, educational operating expenses per student (FTEE) increased slightly with the addition of a full-time equivalent student. In private institutions, except universities, where costs remained about the same, lower costs resulted with the addition of a full-time equivalent student. In all but public universities, the higher the level of student, the higher are educational operating costs, which is consistent with findings in Chapter 3. Further, increasing the number of males and graduate students generally added to educational operating costs/FTEE, with three exceptions: in four-year public

in Table 4-1. Findings in the set summary of Table 4-4 showed that for the other four classes in institutions, as educational operating costs/ FTEE increased, so did the number of males. The presumption that men are more expensive to educate is validated in this study, at least in those institutions with predominently male student bodies (Table 4-4).

For institutions with graduate students: public and private universities, public four-year colleges, and non-sectarian liberal arts colleges, findings in the set summary matched those observed in the multiple regression analysis, as observed in Table 4-3. Increasing numbers of graduate students was matched by additions to educational operating expenditures per student (FTEE) in private universities and non-sectarian liberal arts colleges. The opposite was true in public universities. Measures of variation for graduate students were moderately strong in universities but inconsistent in the remaining three classes which offer graduate programs, suggesting a wide variation in the number of institutions with graduate programs.

No adjustment was made, in the exercise, for component costs or types of programs, technical or non-technical, primarily because of the lack of available data.

level of enrollment (FTEE) the second most important factor, as discussed earlier in Chapter 3. The relationship between enrollment (FTEE) and educational operating costs per student requires a good deal more probing and will be the purpose of the next section.

The Level of Enrollment and Educational Operating Costs

It has become obvious that staffing ratios and the enrollment mix can account for much of the variation in educational operating costs per student. Research also indicated that a fixed proportion of total current expenses, in each class, can be accounted for by educational operating expenses, although it was also noted that expenditures seem to rise with available revenue. Despite the strong suggestion to the contrary, there remains a possibility that institutions of higher education can operate at least on a cost level, particularly if an adjustment can be made for a key cost item: the faculty to student ratio. A further question relates to the movement of the components of educational operating costs with increases in enrollment (FTEE). More specifically:

1. What is the effect of full-time equivalent enrollment, adjusted for the student to faculty ratio, on educational operating expenses per student?
2. How do the relative amounts of the components of educational operating expenses: administration, instruction, library, and plant operations compare with educational operating expenditures, over selected levels of enrollment?

The Effect of Full-time Equivalent Enrollment, Adjusted for Student to Faculty Ratio, on Educational Operating Expenditures/FTEE

On a one-to-one linear basis, the relationship between the student-to-faculty ratio and educational operating costs per student/FTEE was moderately strong: the range and direction of the correlation coefficient being from -.43 to -.54 for all classes but one (Table 2-4). Moderate to strong variation measures for each class mean of the student-to-faculty ratio were also observed (Table 2-3). If the effect of this variable on both enrollment and educational operating expenditures can be neutralized, then it is possible that least cost levels can be identified. This is the purpose of the analysis reported in this section.

Initially, a multiple regression equation for educational operating expenses/FTEE with enrollment and the student-to-faculty ratio was calculated for each class (Table 4-5). The correlation coefficients ranged from .52 to .70, all moderately strong. The marginal linear contribution (marginal R^2) of enrollment (FTEE) was no higher than .02, while marginal Rs for the student-to-faculty ratio ranged from .14 to .41 and accounted for from 50 to 100 percent of the explained variance. A partial linear correlation coefficient was calculated by using the same set of variables but holding the influence of the student-to-faculty ratio constant. The results were weak, with values ranging from -.02 to -.17 as seen in Table 4-5. It was then postulated that perhaps the relationship was non-linear, and the data were then

compared by using a polynomial regression analysis in the following manner. Simple correlation coefficients were calculated between educational operating expenditures per student (FTEE) and the student-to-faculty ratio and then between enrollment (FTEE) and the student-to-faculty ratio. The differences between the actual values and the estimated values from the regression line, also called the residuals, were then correlated using the same method. The results, not presented here, were also weak and disappointing.

TABLE 4-5

COMPARISON OF CHANGES IN EDUCATIONAL OPERATING COSTS PER STUDENT WITH STUDENT-TO-FACULTY RATIO AND ENROLLMENT FOR NORTHEAST REGION INSTITUTIONS, BY TYPE AND CONTROL, 1963-4

Type and Control	Partial Correlation Coefficient[a]	Multiple Correlation Coefficient (R)	Variance (R^2)	Marginal R^2	
				FTEE	FTEE/FTEF[b]
UN-PU	-.05	.64	.41	.00	41
UN-PT	-.02	.59	.39	.00	35
FY-PU	-.05	.53	.28	.02	24
LA-NS	-.17	.70	.50	.02	41
LA-R	-.08	.52	.27	.01	14
JC-PU	-.11	.54	.29	.01	29
JC-PT	-.08	.55	.30	.00	17

[a]The Partial Correlation Coefficient examines the effects of enrollment (FTEE) on educational operating costs, holding student-to-faculty ratio constant. See J. Johnston, Economic Methods. (New York: McGraw-Hill Book Co., 1960), p. 59., for further discussion.

[b]FTEE--Full time equivalent enrollment
FTEE/FTEF--Students-to-faculty ratio

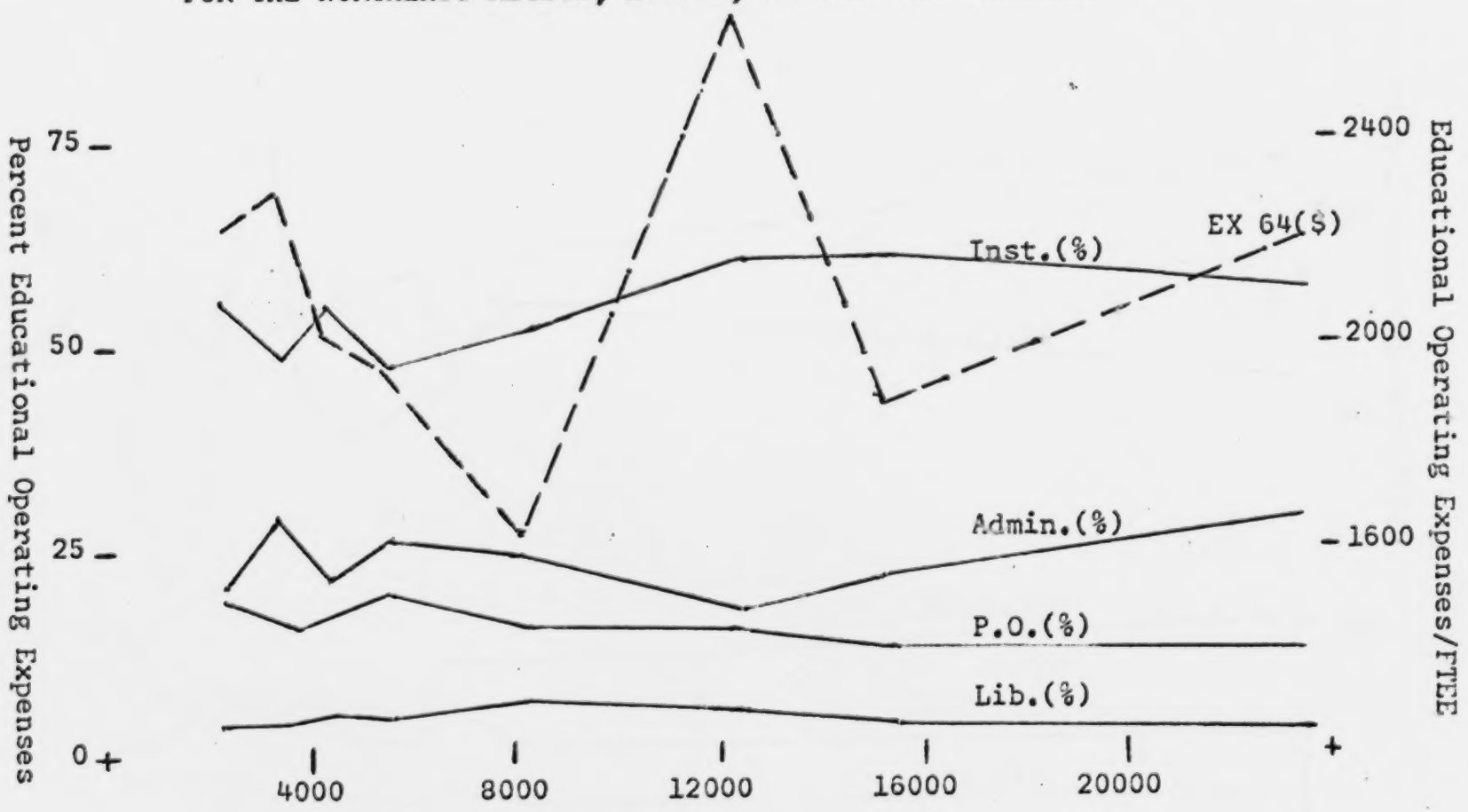
Source: See Table 4-1 for data sources.

TABLE 4-7 (Continued)

Range of FTEE	No. of Schools	FTEE		EX 64		Percent of Educational Operating Expenses for:			
		$\bar{X}$	CV	$\bar{X}$	CV	Admin.	Inst.	Lib.	P.O.
Liberal Arts--Religious									
1- 199	17	178	61	1,740	43	23.9	47.2	7.1	21.9
200- 399	19	492	12	1,100	34	25.5	49.6	5.7	19.4
400- 599	16	712	8	1,253	22	25.8	49.5	5.1	19.6
600- 799	15	912	7	1,214	27	28.7	48.4	6.8	17.0
800- 999	9	1,087	5	1,129	30	28.3	49.0	5.6	17.3
1000- 1199	8	1,289	4	999	20	28.1	52.8	5.6	13.5
1200- 1399	4	1,551	4	823	16	26.4	55.2	5.3	13.0
1400- 1599	5	1,705	4	1,220	35	26.9	50.5	4.0	18.6
1600- 1799	5	1,898	3	1,110	35	31.3	52.3	4.7	11.7
1800- 3699	5	2,944	19	895	11	27.0	54.6	3.9	14.5
Junior College--Public									
200- 399	2	304	17	829	41	22.5	61.4	3.6	12.6
400- 599	7	487	14	602	43	24.4	60.8	4.5	10.4
600- 799	5	721	7	711	42	25.7	56.8	3.9	13.6
800- 999	6	888	5	950	24	24.1	61.6	4.4	10.0
1000- 1299	2	1,064	2	960	12	31.4	55.2	3.2	10.3
1300- 1599	4	1,487	4	791	22	19.1	67.6	2.7	10.6

GRAPH 4-1B

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, 1963-4, PRIVATE UNIVERSITIES[a]

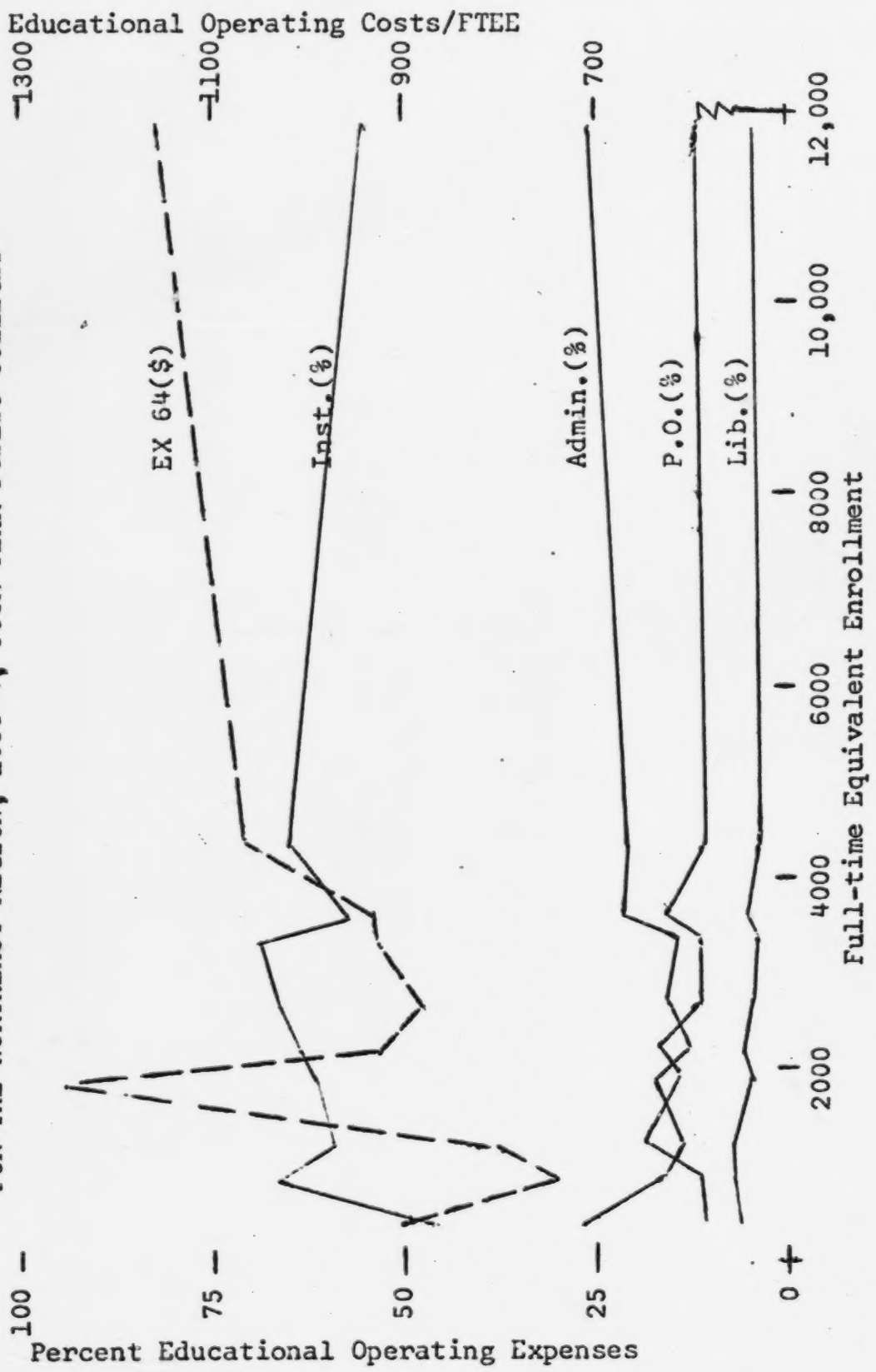


[a]See Graph 4-1A on reading instructions.

Source: Table 4-7.

GRAPH 4-1C

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, 1963-4, FOUR YEAR PUBLIC COLLEGES[a]

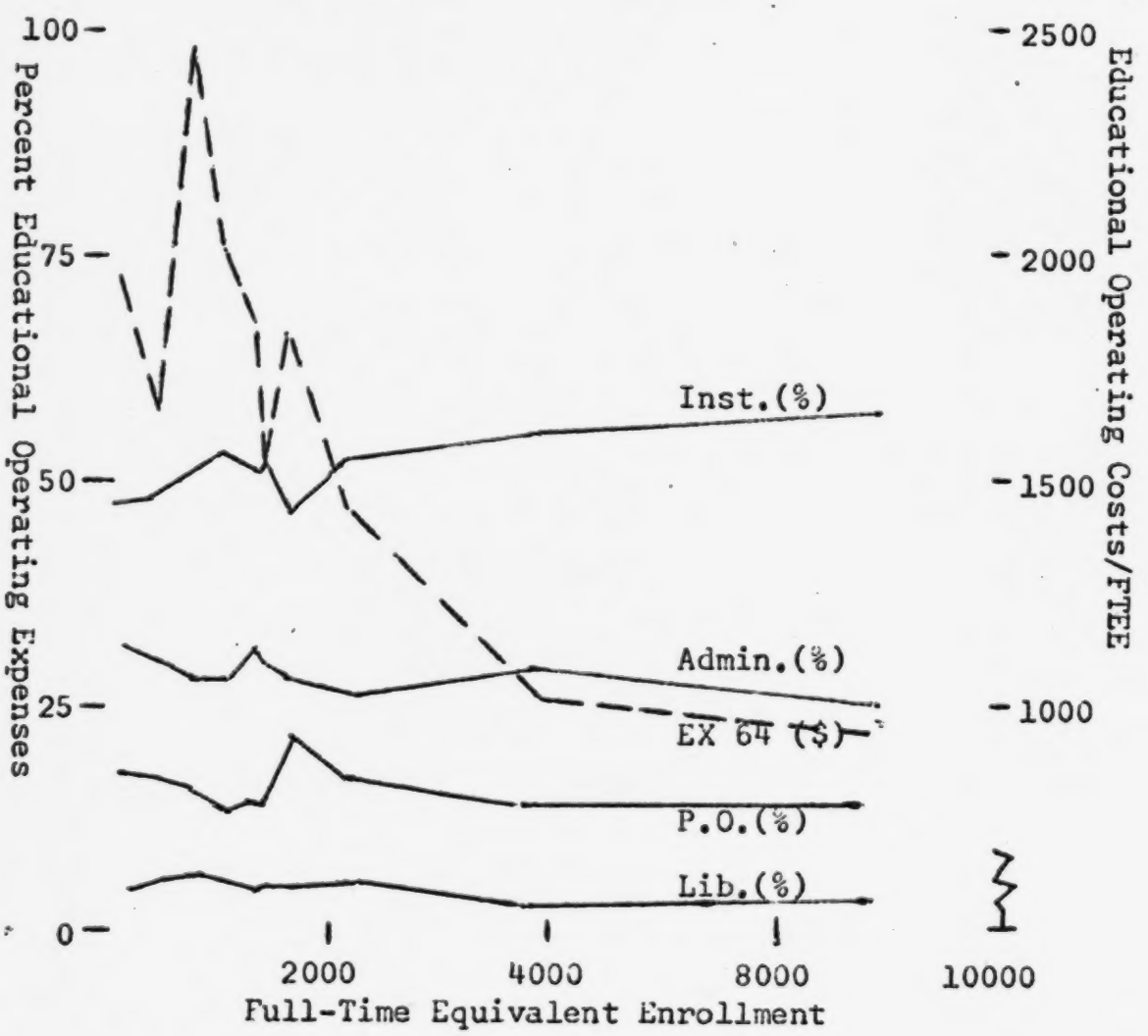


Source: Table 4-7.

[a]See Graph 4-1A for reading instructions.

GRAPH 4-1D

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, 1963-4, NON-SECTARIAN LIBERAL ARTS COLLEGES[a]



[a]See Graph 4-1A for reading instructions

Source: Table 4-7.

tions. In absolute, or dollar terms, there is a downward trend[1] for both variables. The relative share of administrative and instructional costs mirrored each other at enrollment (FTEE) intervals. They appeared to increase with enrollment intervals, both relatively and on an absolute basis, with a trade-off between the two components, which was dependent on the level of educational operating expenditure per student (FTEE). That is, once a certain level of instructional costs is reached, extra funds go into administrative functions. At lower expenditure levels, instructional costs demand a larger share of operating expenditures, perhaps reflecting the highly competitive market for faculty members.

The lower relative cost for library and plant operations, at higher levels of FTEE, is in part an indication of the existence of economies of scale. Unfortunately, these two components comprise only 20 percent of total costs and their influence is offset by the remaining 80 percent, wherein administrative and instructional cost components clearly seem to rise with increased revenue. That is, as additional funds become available, institutions tend to expand administrative services rather than reducing the costs per student.

Finally, there was also some evidence that educational operating costs decrease in all institutions, to the 1,000 to 1,500 enrollment (FTEE) interval. Decreased costs were noted at around the

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[1]Absolute values are not shown. They may be obtained by applying the relative factors in Table 4-7 with educational operating costs for each set interval.

3. Administrative costs,on a relative basis, and educational operating costs (FTEE) move in the same direction, although the movements of expenditures are much wider over all levels of enrollment.
4. Instructional expenditures are more consistent, in an absolute sense, than other costs and are highly correlated with educational operating costs (FTEE).
5. There is a downward trend in costs for private four-year and two-year institutions, at least at the 1,000 to 1,500 enrollment level.

Educational Operating Costs and the Growth of Enrollment

Efforts to identify least cost levels of enrollment have produced limited results. However, it may be possible to identify least cost increments of enrollment (FTEE). Specifically, the question is: what is the relationship between the growth of enrollment (FTEE) and the growth of educational operating costs per student (FTEE)? A further question relates to least cost level of enrollment (FTEE) and the selectivity level of student.

It was established that there is a rather consistent relationship between educational operating costs per student (FTEE) and enrollment (FTEE), in private four-year and two-year institutions. An implication of this observation is that there may be a consistent relationship between enrollment growth and the growth of educational

operating costs. Unlike previous research in the chapter, which focused on Fiscal year 1964, two Fiscal years (1962 and 1964) will be used. The decimal (or rates of) change in enrollment (FTEE) and educational operating costs per student (FTEE), based on Fiscal year 1962, have been determined by class. Further, a "growth ratio" has been calculated to determine how the two rates of change compare. The "growth ratio" is defined as: the decimal change in educational operating costs, divided by the decimal change in full-time equivalent enrollment (FTEE). It is interpreted as follows:

1. When the "growth ratio" exceeds one (1), the implication is that the addition of students has increased the per-student educational operating costs.
2. If the ratio is equal to one (1), the addition of students (FTEE) does not change the per-student educational operating costs.
3. If the ratio is less than one (1), the addition of students (FTEE) decreases educational operating costs per student.

Data have been analyzed by using not only class means, correlations, and the growth ratio, but also a set interval analysis, based on the decimal change in enrollment (FTEE). All fiscal 1962 data have been adjusted for changes in prices by using the full adjustment factor (.922).

Comparisons of Growth Rates and Ratios

From Table 4-8, we see that the adjusted decimal change in educational operating costs exceeded the change in enrollment, in all classes. The growth ratios also reflect this activity. Variation

TABLE 4-8

COMPARISON OF SELECTED RATIOS OF COST AND ENROLLMENT, BY TYPE AND CONTROL OF INSTITUTION, 1961-2 and 1963-4, NORTHEAST REGION[a]

Type and Control	Decimal Change in FTEE[b] 1962 to 1964		Decimal Change in Costs[b] 1962 to 1964		Correlation Coefficient (Col. 2 & Col. 3)	Growth Ratio[c] Col.3/ Col.2
	$\bar{X}$	CV	$\bar{X}$	CV		
UN-PU	.162	6	.250	6	.43	1.59
UN-PT	.082	100	.208	50	.50	2.54
FY-PU	.241	50	.304	8	.27	1.26
LA-NS	.134	12	.258	9	.23	1.92
LA-R	.125	12	.267	12	.53	2.13
JC-PU	.268	11	.471	9	.38	1.76
JC-PT	.151	21	.169	17	.58	1.12

[a]1961-2 prices adjusted to 1963-4 prices, using the full price index (See also Appendix V). 1961-2=.922.

[b]The percentage change in enrollment from 1962 to 1964 may be found by multiplying values by 100. The same is true with respect to the percentage change in total educational operating expenses from 1962 to 1964.

[c]Percentage change in educational operating expenses divided by the percentage change in enrollment (FTEE).

Source: See Table 4-1 for data sources.

TABLE 4-10

A SET SUMMARY BASED ON LEVEL OF STUDENT FOR GROWTH RATES OF ENROLLMENT (FTEE) AND COSTS FOR NORTHEAST REGION INSTITUTIONS BY TYPE AND CONTROL FOR THE PERIOD 1961-2 TO 1963-4

L.S.[a]	No.	Decimal Change in FTEE[a]		Decimal Change in Costs[a]		Growth Ratio[b]
		$\bar{X}$	CV	$\bar{X}$	CV	
Universities--Public						
3	4	.136	52	.218	46	1.60
4	3	.222	37	.324	58	1.46
Universities--Private						
1	8	.068	37	.179	26	2.63
2	7	.043	109	.227	58	5.28
3	6	.090	107	.178	53	1.98
4	6	.116	80	.224	46	1.81
5	1	.213	0	.316	0	1.78
Four Year--Public						
2	1	.298	0	.730	0	2.45
3	3	.110	14	.269	47	2.37
4	18	.246	56	.384	63	1.24
5	35	.249	43	.295	84	1.18
Liberal Arts--Non-Sectarian						
1	6	.097	133	.173	41	1.78
2	11	.059	67	.147	62	2.49
3	18	.110	100	.231	77	2.10
4	8	.156	61	.388	68	2.48
5	15	.223	94	.360	87	1.61

two year period, would be well advised to expand in rather large increments of enrollment (FTEE). Most of the enrollment growth, however, has occurred in institutions with the lowest selectivity level of students, while increases in spending on educational operating expenses have been greatest in the more selective institutions.

The discoveries made thus far are interesting, but it is not yet time to bring together the results since the yearly plant cost per student remains to be explored.

CHAPTER 5

THE RELATIONSHIP BETWEEN PHYSICAL PLANT AND EDUCATIONAL OPERATING EXPENSES

It has been suggested, and appears to be a reasonable hypothesis, that the physical plant capacity of an institution, in the physical plant sense, is related to the facilities unit with the lowest level of student capacity. There is another variation of this observation; that is, the physical plant capacity of an institution is related to the ability of the institution to subsidize additional students, up to the physical plant capacity. Capacity then is a function of both the available plant space and institutional wealth, or the educational operating subsidy per student (FTEE). To this point, the educational operating subsidy was considered to be the amount an institution subsidized each student. This is only partially true since no consideration has been given to the yearly cost of plant; that is, the amount the physical plant wears out through use or obsolescence. Traditionally, institutions of higher education have not accounted for the yearly cost of plant in calculating the cost of the instructional function. Public institutions, for example, have no need to account for these costs since most capital construction

is funded separately from the operating funds. New buildings are justified on the basis of state higher education enrollment plans and needs. Private institutions, on the other hand, use grants and gifts from both federal and private sources to replace buildings and equipment. As a result, they have not felt the need to adjust for the yearly cost of plant. Even if they wished to do so, it is highly unlikely that institutions could pass on the cost of physical plant to students, since most institutions now subsidize part of the educational operating cost per student. Buildings and equipment replacement costs, however, are not free goods and as a result should, and will, be considered.

The yearly plant cost consists of two items: yearly depreciation cost, wear or use and obsolescence, and interest costs: the amount it costs to borrow funds for building and/or land and equipment. From this statement, two questions have been framed for analysis in this chapter.

1. What is the relationship between educational operating costs and plant value per student?
2. What is the relationship between educational operating costs and the yearly cost of plant?

Data used in this section are primarily from Fiscal Year 1964, although Fiscal 1961 and 1967 data were used extensively. Plant value per student is considered to be representative of academic and general plant value per student (FTEE). This assumption is justified

(FTEE) and enrollment (FTEE), in all but three classes: non-sectarian and religiously controlled liberal arts and private junior colleges. Even for these classes, the relationship was only moderately strong (-.31 to -.39) and in a negative direction. This negative movement in plant value per student, for private institutions, is consistent with the movement of educational operating expenses per student (FTEE) and enrollment increases reported in Chapter 4. These findings are somewhat inconsistent with the hypothesis.

TABLE 5-4

SIMPLE LINEAR CORRELATION COEFFICIENTS FOR PLANT VALUE AND EDUCATIONAL OPERATING EXPENDITURES, OPERATING SUBSIDY/FTEE AND ORGANIZED RESEARCH FOR THE NORTHEASTERN REGION BY TYPE AND CONTROL, 1963-4

Type and Control	EX 64[a]	Subsidy[a]	FTEE[a]
UN-PU	.53	.74	.07
UN-PT	.85	.87	-.10
FY-PU	.65	.60	-.19
LA-NS	.75	.73	-.31
LA-R	.53	.63	-.38
JC-PU	.62	.70	.09
JC-PT	.30	.45	-.37

[a]EX 64--Educational operating expenses
Subsidy--Educational operating subsidy
FTEE--Enrollment

Source: See Table 5-1 for sources of data.

Junior colleges were excluded from the analysis since values for the selectivity level of students are not available.

The set interval analysis in Table 5-6, based on the selectivity level of students, suggests that plant value per student, for both sets of data, was highest in the most selective institutions. This applies to all classes except public universities. In the private sector, plant value per student (FTEE) ranged from 50 percent to 150 percent more in the highest level, for both fiscal periods (Table 5-6). The values in the public sector exhibited no consistent pattern. On the other hand, the ratio of plant value to educational operating expenses was fairly consistent over all set intervals in the Fiscal 1962 to 1964 period, running from 4.2 to 4.6 in 9 out of 15 sets (level 5 excluded). Only religiously controlled liberal arts colleges appeared out of line, where ratio values ranged from 6.4 to 7.7 in 4 sets. In Fiscal 1967, 8 out of 15 sets had rather consistent ratios, ranging from 3.7 to 4.3. Again, religiously controlled liberal arts colleges were the exception as values in 4 sets ranged from 5.6 to 5.7. Comparing ratio value by set interval over two periods, with or without an adjustment for price, reveals a drop in 12 out of 15 sets. The fall in the ratio of plant value to educational operating costs was accompanied by an increase in enrollment (FTEE). In only one set interval were opposite movements noted.

TABLE 5-6

A COMPARISON OF PLANT VALUE/FTEE, ENROLLMENT (FTEE) AND THE RATIO OF PLANT VALUE TO EDUCATIONAL OPERATING EXPENSES FOR NORTHEAST REGION INSTITUTIONS BY TYPE, CONTROL, AND LEVEL OF STUDENT FOR THE MEAN OF FISCAL 1962 AND 1964, AND FISCAL 1967

Level of Student	$\overline{PV}^a/\overline{EX}^b$	$\overline{PV\ 67}^b/EX\ 67$	$\overline{PV}^a$		Plant Value 1967		$\overline{FTEE}^a$		FTEE 67	
	$\overline{X}$	$\overline{X}$	$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	CV
Universities--Public										
3	4.6	4.3	6,286	33	6,479	38	11,544	49	15,422	50
4	3.4	4.7	5,372	9	7,649	2	6,415	46	5,440	20
Universities--Private										
1	4.5	4.0	13,833	40	16,513	38	9,183	51	8,784	57
2	4.4	4.1	8,200	27	9,593	29	4,707	37	8,186	23
3	3.4	2.3	6,511	43	5,275	6	11,233	62	10,333	78
4	2.8	2.7	3,103	21	3,292	30	6,945	46	10,686	61
Four Year--Public										
3	3.5	1.9	4,300	64	4,559	0	6,776	68	8,601	65
4	4.2	3.5	3,779	54	2,827	56	2,640	88	3,754	73
5	4.5	3.9	4,806	59	4,016	57	1,800	85	2,956	98
Liberal Arts--Non-Sectarian										
1	4.4	4.8	10,757	58	15,273	44	1,224	25	1,411	34
2	4.4	3.8	9,346	42	10,439	38	1,312	51	1,412	34
3	4.5	4.2	7,497	39	7,587	39	1,276	89	1,710	124
4	4.5	4.3	4,993	49	6,384	74	1,266	47	3,285	161
5	4.1	3.7	5,655	79	5,758	47	1,255	157	1,194	44

TABLE 5-6 (Continued)

Level of Student	$\overline{PV}^a/\overline{EX}^b$	$\overline{PV}$ 67^b/EX 67	$\overline{PV}^a$		Plant Value 1967		$\overline{FTEE}^a$		FTEE 67	
	$\overline{X}$	$\overline{X}$	$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	CV	$\overline{X}$	CV
Liberal Arts--Religious										
2	7.7	5.6	12,351	62	9,937	36	783	36	1,869	15
3	7.3	5.6	8,648	90	8,274	37	1,075	73	1,249	66
4	6.4	5.7	6,582	56	6,627	54	849	54	1,302	60
5	8.0	7.2	9,371	103	9,988	122	818	85	696	83

[a]Mean plant value/FTEE ($\overline{PV}$), mean educational operating expenditures/FTEE ($\overline{EX}$), and full-time equivalent enrollment ($\overline{FTEE}$) derived by using 1961-2 and 1963-4 values divided by two afterweighting for differences in full-time equivalent enrollment for each year.

[b]The ratio of plant value to educational operating expenses.

Source: See Table 5-1 for source of data.

In the previous section, little information was revealed to support the supposition that in a number of institutions, the lower the level of the educational operating subsidy per student (FTEE), the less likely it is that the physical plant will be used effectively. This, however, may be true of religiously controlled liberal arts colleges. Considering only religiously controlled liberal arts colleges, we note that there are increases in enrollment for each set interval (Table 5-6). The value of plant fell or remained about the same in all three set intervals (level 5 excluded) without an adjust-

Section Summary

The intention of this section was to analyze the relationship between educational operating expenses per student (FTEE) and the enrollment mix, to determine which of the items had the greatest influence on costs and to identify consistency among classes of institutions. It can generally be stated, given the moderate to strong relationships identified, that the impact of an individual item in the enrollment mix on educational operating costs per student (FTEE) was mixed. More specifically, we observed in the multiple regression analysis that as public institutions added students (FTEE), educational costs per student (FTEE) rose slightly. In private institutions, the opposite trend was generally true; costs fell more distinctly as students (FTEE) were added.

Based on these observations, it is suggested that the concept of economies of scale (educational operating costs per student fall as enrollment [FTEE] increases) is generally operative in the private sector and not the public sector. In absolute amounts, educational operating costs per student (FTEE) are greater in all private institutions, by type of institution. Increasing costs and enrollment in the public sector, however, are more a reflection of the formula method by which each state funds public institutions rather than the failure of the concept of economies of scale. Also, in the private institutions, as improvements were made in the selectivity level of student and in the

percent of male, full-time, and graduate to total students, increases were recorded in educational operating costs per student with one exception; additions to the percent of full-time students in religiously controlled liberal arts colleges decreased costs. In the public sector, the same trend was noted, but again with one exception; as the ratio of graduate to total students increased, educational operating costs per student (FTEE) fell. This latter trend in costs may be due in large part to the greater number of part-time graduate students attending these institutions.

The increase in educational operating cost per student, resulting from the addition of a single unit of an enrollment mix variable, differs widely by class of institution. Comparison of these costs among classes is difficult because the range of each variable differs considerably by type and control of an institution. In those instances where the range of values for the enrollment mix are similar, some consistency in costs (beta coefficients) are visible. For example, in private universities and non-sectarian liberal arts colleges, the unit costs for the selectivity level of student,the graduate to total student ratio, and to some degree the full-time to total student ratios, were similar. Religiously controlled liberal arts and private two-year colleges also had similar unit costs for enrollment (FTEE) and the full-time to total student ratio. In all other classes the values differed widely. Yet, in most classes, the selectivity level of student was the single most important factor in influencing costs, with the

1600- 1899	5	1,738	3	705	16	19.2	64.4	4.1	12.4
1900- 2499	3	2,198	10	888	32	20.7	66.9	3.1	9.4
2500- 5000	3	3,764	19	723	30	21.0	65.1	1.8	11.7

Junior College--Private

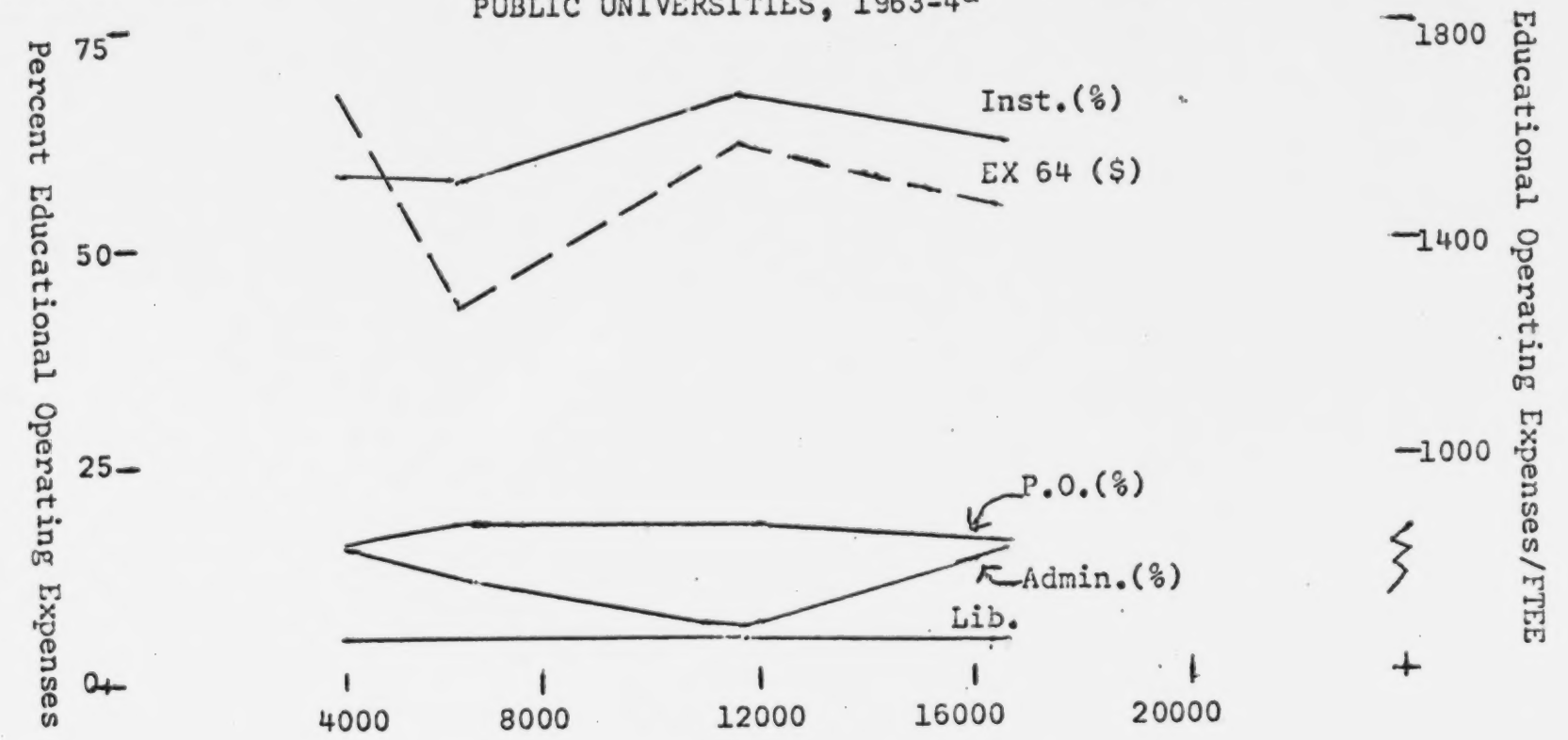
1- 99	24	50	41	1,671	37	24.1	50.6	9.3	15.9
100- 199	8	136	19	1,154	52	26.6	48.1	4.6	20.8
200- 299	5	239	13	961	48	29.0	48.5	3.0	19.6
300- 399	9	349	9	1,461	44	32.1	46.7	4.4	16.9
400- 599	3	506	12	953	22	31.5	43.3	2.8	22.3
600- 699	4	658	5	1,246	14	31.3	44.2	3.1	21.5
700- 799	2	724	2	1,120	37	27.1	51.8	3.0	18.1
800- 999	3	864	6	800	35	31.6	44.1	4.6	19.8
1000- 1500	2	1,374	2	673	19	31.3	56.5	3.0	9.4
Over 1500	1	2,465	0	885	0	20.3	57.5	1.4	20.9

[a]See Table 4-6 for additional terminology

Source: See Table 4-1 for data sources.

GRAPH 4-1A

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, PUBLIC UNIVERSITIES, 1963-4[a]



Full-Time Equivalent Enrollment

[a]To read graph left vertical scale indicates the percent of total educational operating expenditures for each component (solid lines). The right vertical scale indicates the dollar value of educational operating expenses per FTEE (dotted line) while the horizontal scale indicates full-time equivalent enrollment. Data points plotted are mean interval values for components with enrollment and educational operating expenses/FTEE with enrollment from Table 4-6. Abbreviations: EX 64--educational operating expenses per student; also percent of educational costs; for instruction--inst.; for administration--admin.; for plant operations--P.O.; for library--Lib. Source: Table 4-7.

6,000 to 9,999 and 14,000 to 17,999 enrollment intervals (FTEE) in universities, but in both instances the evidence is incomplete. The most that can be said, with respect to least cost enrollment levels, is that the evidence, although incomplete, does not completely rule out their existence.

Section Summary

The results of the analysis of educational operating costs and enrollment were negative, after adjusting each for the effect of the student-to-faculty ratio. It was concluded that the adjustment for professional wages, which make up over 75 percent of all educational operating costs, neutralized the effect of economies of scale on the remaining portion. The analysis was concluded on this note.

Institutions, in an apparent attempt to provide students with the best in educational services, were found to spend most of their funds on instruction, regardless of the absolute level of expenditures. Colleges and universities also appear to take advantage of economies of scale in plant and library operations, for as enrollments increase a smaller relative share of expenditures is used for these two functions. The impact of library and plant operating costs on educational operating costs is limited, however, since they account for only one fifth of all educational operating costs. When additional funds are available, the administrative function is expanded (or contracted when funds are diminishing).

Least cost levels of enrollment can be identified, based on educational operating expenditures in Graph 4-1. However, the question of reliability remains, particularly when specific enrollment levels are suggested. On the other hand, trends may be accepted with greater reliability. Except for universities, private institutions exhibit decreasing educational operating costs per student with increases in enrollment (FTEE). In private universities, as well as public, educational operating costs per student rise after a certain level and fall off beyond that point. Educational operating costs per student (FTEE), in public institutions, fluctuate less than those for their private counterparts, a somewhat anticipated result considering that formula base state grants are the principal funding source. While costs for four-year public institutions increase slightly with enrollment, costs for public junior colleges had a negative trend, coinciding with the downward trend of the private junior colleges. Although some uncertainty remains as to specific enrollment levels, costs continued to fall down to the 1,000 to 1,500 enrollment (FTEE) interval, in all private institutions.

Considering the consistency of the findings thus far, it appears valid to restate several generalizations:

1. Library and plant operating costs use a slightly decreasing proportion of educational costs with increasing enrollment.
2. Administrative and instructional costs, on a relative basis, move in opposite directions, over all levels of enrollment.

TABLE 4-10 (Continued)

L.S.[a]	No.	Decimal Change in FTEE[a]		Decimal Change in Costs[a]		Growth Ratio[b]
		$\bar{X}$	CV	$\bar{X}$	CV	
Liberal Arts--Religious						
2	3	.186	94	.130	36	.67
3	25	.105	100	.182	93	1.74
4	27	.127	117	.355	136	2.79
5	36	.124	154	.270	71	2.18

[a]See Table 4-9 for explanation of table headings. The only change is column 1, L.S., on which data is sorted, indicates the selectivity level of students.

[b]Calculated by dividing change in educational operating expenses by change in enrollment (FTEE).

Source: See Table 4-1 for data sources.

shown (Chapter 3) that changes in costs are not influenced by the level of student. The significance of this finding is that the least selective schools, which generally have less operating revenue and therefore are able to offer fewer resources to their students, were the institutions called upon to accept the increasing number of students. The more selective schools had lower enrollment growth rates, thereby improving their already strong competitive advantage in resources. There is some evidence that this trend continued up to Fiscal year 1967, since most enrollment growth has occurred in the public sector. Further, as

was noted in Chapter 3, many institutions have been able to attract a higher selectivity level of student without adding resources. Most of this movement occurred in the least selective institutions.

Section Summary

A fairly consistent relationship between the change in enrollment and the change in educational operating costs, using full adjustment for price, was observed for a two-year period. This, despite the fact that public institutions are bound by fixed revenue formulas and some institutions have added to educational services offered to students. The findings which are a function of both enrollment growth and the price adjusting factor may be summarized as follows:

1. Enrollment growth rates of less than .15, for a two-year period, generally had values of greater than two (2) in the enrollment growth ratio. (The enrollment growth ratio is: the change in total cost divided by the change in enrollment.)
2. Enrollment growth rates of between .15 and .30, for a two-year period, generally had values between one (1) and two (2) in the growth ratio.
3. Enrollment growth rates above .30, for a two-year period, generally had values near or below one (1) in the growth ratio.

While there may be some question about precise growth rates, the findings are clear in that institutions which intend to expand over a

To determine the multiple relationship between the educational operating subsidy, plant value, and enrollment (FTEE), a multiple regression analysis was prepared for all seven classes (Table 5-5).

TABLE 5-5

THE MULTIPLE LINEAR REGRESSION ANALYSIS BETWEEN PLANT VALUE PER STUDENT (FTEE) AS A FUNCTION OF THE OPERATING SUBSIDY/FTEE AND ENROLLMENT (FTEE) NORTHEAST REGION, 1963-4, BY INSTITUTION, TYPE AND CONTROL

Type and Control	Multiple Correlation Coefficient	Variance	Sign of Regression Coefficient[a]		Marginal R^2 for:	
			Subsidy per Student	Enrollment (FTEE)	Subsidy per Student	Enrollment (FTEE)
UN-PU	.75	.56	+	+	.55	.01
UN-PT	.88	.77	+	-	.76	.01
FY-PU	.67	.46	+	-	.43	.10
LA-NS	.75	.56	+	-	.46	.02
LA-R	.64	.41	+	-	.27	.01
JC-PU	.65	.41	+	+	.40	.01
JC-PT	.43	.21	+	-	.05	.01

[a]This sign represents the direction of the change in plant value for a unit change in the indicated variable.

Source: See Table 5-1 for sources of data.

In particular, an attempt was made to determine the effect on plant value of changes in the operating subsidy and enrollment. (Plant value/FTEE is a function of the operating subsidy/FTEE and enrollment [FTEE].) The results indicate strong multiple relationships

in all classes of institutions. The multiple correlation coefficient ranged from .64 to .88. Further, the operating subsidy/FTEE was the dominating influence in explaining the variance in plant value/FTEE. In all public and private institutions, enrollment had a negligible influence on the variance in plant value/FTEE. As in the one-to-one case, increases in the operating subsidy per student (FTEE) added to plant value per student (FTEE). At the same time as enrollment increased, in all but public universities and public two-year colleges, the plant value per student (FTEE) fell. This latter observation was consistent with the one-to-one case. Thus the operating subsidy and plant value per student (FTEE) moved in the opposite direction of enrollment. To a moderate degree there is some suggestion of economies of scale, but no proof of the hypothesis that plant is better utilized if an institution has sufficient wealth to subsidize additional students, given available plant capacity.

Plant Values and the Selectivity Level of Student

The purpose of this section is to compare the ratio of plant value to educational operating expenses and compare plant value per student by the selectivity level of student for two sets of data: the average of the Fiscal 1962 and Fiscal 1964 years and Fiscal 1967.[1]

---

[1]Plant value for Fiscal 1964 not available by selectivity level of student. Values correlate highly in any case.

Junior Colleges--Private

7	494	26	598	70	NA	-	.80	31	.60	66	00	-
6	696	8	484	99	"	-	.73	25	.46	71	"	-
7	936	4	615	127	"	-	.82	22	.25	139	"	-
7	1,109	5	240	76	"	-	.78	40	.15	160	"	-
9	1,286	5	351	79	"	-	.93	15	.25	148	"	-
9	1,524	4	204	122	"	-	.88	20	.45	112	"	-
4	1,676	4	125	110	"	-	.55	50	00	00	"	-
3	1,930	2	133	101	"	-	1.00	00	.67	71	"	-
6	2,232	7	110	103	"	-	.62	32	.19	143	"	-
3	2,959	10	132	108	"	-	.99	1	.33	141	"	-

[a]Range of expenditure values same as those in Table 2-4. Mean interval value indicated where Mean=$\bar{X}$ and coefficient of variation=CV.

[b]See Table 4-1 for interpretation of variables.

Source: See Table 4-1 for data sources.

did the level of student, in all classes but public universities. A distinct trend was also noted in Table 4-4 in the percent of full-time students ratio; the higher the level of expenditures, the higher the ratio. Again it is clear that full-time students cost more to educate, suggesting that the addition of part-time students will cut per student costs. There is also some evidence that a large percentage of all students who attend the less selective institutions are on a part-time basis. Conversely, institutions with a higher selectivity factor have fewer part-time students and spend more per student, as witnessed in Table 4-4. Additionally, religiously controlled and private two-year colleges do not recruit or attract many part-time students. It appears that these schools cater to the students who desire a full-time religious oriented education in a small school environment. The patterns observed by set interval were also rather consistent in most cases within each set interval. For example, as educational operating costs/FTEE rose, the number of full-time students increased in universities, non-sectarian liberal arts colleges, and public junior colleges, with variation measures which were strong to moderate. The full-time to total students ratio in four-year public institutions was consistent over all sets with strong to moderate variation. Values for junior colleges, however, were generally inconsistent with weak measures of variation.

Three classes of institutions had more women than men: religious and public four-year institutions, and private junior colleges, as noted

TABLE 4-7

SET INTERVAL ANALYSIS BASED ON FULL-TIME EQUIVALENT ENROLLMENT WITH EDUCATIONAL OPERATING EXPENDITURES/FTEE IN DOLLARS AND COMPONENTS AS A PERCENT OF TOTAL, NORTHEAST REGION INSTITUTIONS, 1963-4[a]

Range of FTEE	No. of Schools	FTEE		EX 64		Percent of Educational Operating Expenses for:			
		$\bar{X}$	CV	$\bar{X}$	CV	Admin.	Inst.	Lib.	P.O.
Universities--Public									
3000- 4999	2	4,326	11	1,692	18	18.7	60.9	5.3	15.0
5000-10999	3	6,606	18	1,296	7	17.8	60.5	4.4	17.4
11000-11999	1	11,833	0	1,587	0	12.2	66.4	4.6	16.8
12000-21000	4	16,608	21	1,458	20	20.5	61.0	4.1	14.7
Universities--Private									
2000- 2999	1	2,317	0	2,241	0	20.3	56.4	4.2	19.0
3000- 3999	4	3,365	8	2,314	18	29.4	49.8	4.7	16.2
4000- 4999	6	4,370	5	2,121	46	22.2	54.3	6.8	16.8
5000- 5999	3	5,441	1	1,958	57	27.1	48.5	5.3	19.1
6000- 9999	4	8,035	13	1,658	61	24.8	52.7	7.1	15.5
10000-13999	5	12,247	8	2,652	42	18.1	60.8	6.0	15.1
14000-17999	4	15,285	7	1,880	41	21.0	60.8	4.8	13.4
Over 18000	0	23,553	0	2,212	0	28.4	56.0	2.5	13.1

Four Year--Public

100- 549	6	305	36	900	22	26.3	47.1	6.0	10.9
550- 999	7	780	20	731	32	16.9	65.1	6.2	11.8
1000- 1499	7	1,186	10	804	30	14.6	60.0	6.2	19.2
1500- 1999	7	1,882	4	1,269	31	18.0	62.6	4.6	14.6
2000- 2499	9	2,193	5	938	29	14.2	63.7	5.8	16.3
2500- 2999	6	2,623	5	889	30	17.2	66.4	4.5	12.0
3000- 3499	9	3,306	4	933	30	15.2	68.8	4.2	12.0
3500- 3999	2	3,572	0	939	3	21.8	56.5	5.1	16.6
4000- 4999	2	4,330	6	1,074	17	21.1	64.6	3.3	10.9
9000-13999	3	11,973	15	1,158	4	25.7	59.0	4.2	11.1

Liberal Arts--Non-Sectarian

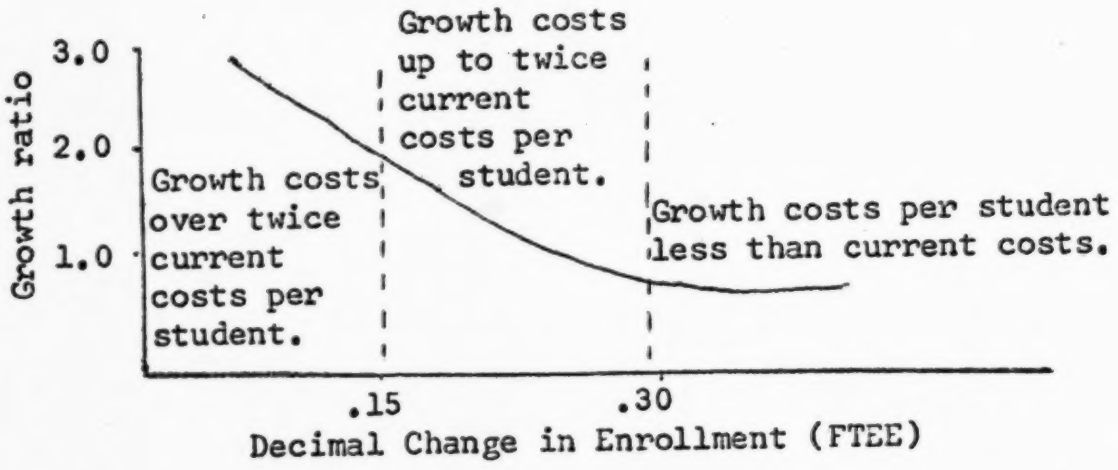
100- 499	7	238	36	1,962	27	31.3	47.4	4.1	17.2
500- 699	11	539	12	1,665	28	29.1	48.7	5.2	17.0
700- 999	7	862	8	2,471	30	27.4	51.3	5.8	15.6
1000- 1199	9	1,153	3	2,017	53	27.6	53.9	4.9	13.7
1200- 1399	8	1,318	5	1,848	27	30.2	50.7	4.5	14.6
1400- 1599	9	1,498	4	1,541	33	28.9	51.8	4.8	14.5
1600- 1999	4	1,707	5	1,835	38	27.3	45.7	4.8	22.3
2000- 2599	5	2,224	10	1,417	47	26.6	52.6	4.9	15.9
2600- 5999	3	3,958	32	1,007	14	28.3	54.3	3.8	13.6
6000- 9999	2	8,812	2	948	7	25.3	57.0	4.1	13.6

modified basis, at the same enrollment intervals. Further, they moved in a direction opposite to that of the relative share of instructional costs. The relative share of library and plant operating costs, however, dropped, or at worst remained level. A positive trend in educational operating costs per student (FTEE) was noted for public four-year institutions, as enrollment (FTEE) intervals increased. No particular one least cost level was suggested. In the private liberal arts institutions, as the enrollment (FTEE) intervals increased, educational operating costs/FTEE moved downward. In the non-sectarian schools, a leveling off in costs/FTEE was observed at the 2,000 to 2,599 enrollment interval (FTEE), while in the religiously controlled institutions it ranged between 1,200 and 1,399 students (FTEE).

The public and private two-year colleges matched their counterparts in the four-year classes with respect to the movement of the relative share of the components of educational operating costs. For public junior colleges, educational operating costs per student (FTEE) fluctuated with increased enrollment (FTEE) intervals, although the direction was negative. The trend in the private sector was for costs to fall--down to the 1,000 to 1,500 enrollment interval.

Several generalizations can be made from these observations and applied to all institutions. First, at higher enrollment (FTEE) intervals, a slightly decreasing proportion of educational operating expenditures per student (FTEE) were used for plant and library opera-

growth ratio was equal to or less than one (1) in most cases. This general trend was observed in all classes with few exceptions. The size of the growth ratio is also a function of the size of the price adjusting factor. Changing the price adjusting factor changes the educational operating cost growth rate and, in turn, the growth ratio. This suggests that while the shape of the growth ratio curve is valid, the specific points at which the growth ratio is greater than, equal to, or less than one, are not. The following graph depicts the general relationships.



The relationship is non-linear and in a negative direction: the greater the change in enrollment, the lower the educational operating costs for the new students. One final comment; these observations are for a two-year period, but it is not proper to merely halve the ratios for yearly figures, since institutions can make short term adjustments for enrollment growth in education operations which might not be feasible over a two-year span.

It was also hypothesized that the size of an institution may contribute to the magnitude of the change in total educational operating expenditures. No validity of this assumption was established by a set summary on enrollment (not shown), nor in a multiple regression analysis (not shown), which indicated that the change in enrollment (FTEE) itself contributed most of the explained variation for changes in educational operating costs. Low linear correlation coefficient values do not, in themselves, rule out non-linear relationships in the multiple case. However, a set summary offered no proof of the relationship either. Further use of the adjustment for enrollment size was abandoned at this point.

Growth of Enrollment (FTEE) and Educational Operating Expenses by Level of Student

The essence of this section relates to the demand for college spaces and the desirability of maintaining a number of highly selective institutions of higher education which are interested in providing maximum educational operating resources for their students. The evidence suggests that there are a number of institutions which are willing to provide spaces while others are concerned with being selective. Verification of these observations may be found in Table 4-10. Excluding those set intervals with one institution only, growth of enrollment was generally smaller in the more selective institutions, while total operating costs increased more rapidly. The only exception to this trend is religiously controlled liberal arts colleges, in which it has been

costs in these institutions added more to the cost of the instructional function, on a relative basis, than was the case in the other five classes. It appears that about 10 percent of educational operating expenses per student is a reasonable estimate of the yearly cost of the physical plant used for instruction, in all but the least selective institutions. This is an important relationship should it be desirable to develop a student aid program which includes an institutional grant intended to cover physical facilities costs. Unanswered at this point, is identification of true institutional and student financial needs, based on the academic program.

the private four-year and two-year institutions, not only are the plant values and educational operating expenses per student (FTEE) larger in the real sense, but the ratio of plant value to educational operating expenses also exceeds those for the public sector by a rather large margin. Between 1961-2 and 1966-7, there was a rather substantial fall in the ratio for all classes but non-sectarian liberal arts schools, where it remained somewhat constant. During the same period, mean class enrollment (FTEE) increased in all institutions, as seen in Table 5-3. Hence, the fall in plant value per student, in all but non-sectarian liberal arts colleges, may in part be a reflection of economies of scale; plant is used more effectively at higher levels of enrollment.

It has been hypothesized that, if an institution has space available for additional students, unless it can subsidize the additional students, plant will be underutilized. To this end, research indicates that on a one-to-one basis, the educational operating subsidy is strongly related to plant value in private universities and non-sectarian liberal arts colleges (Table 5-4). Moderately strong relationships are suggested in all other classes; the lowest correlation coefficient of .45 is for private junior colleges. Generally, the relationship between plant value and the operating subsidy, in each class, was stronger than the corresponding value for educational operating expenditures and the operating subsidy. A poor linear relationship was observed between plant value per student

TABLE 5-3

A COMPARISON OF EDUCATIONAL OPERATING SUBSIDY PER STUDENT (FTEE) AND ENROLLMENT (FTEE) BY TYPE AND CONTROL; 1961-2; 1963-4; 1966-7; NORTHEAST REGION INSTITUTIONS OF HIGHER EDUCATION

Type and Control	Educational Operating Subsidy/FTEE[a]						Enrollment (FTEE)					
	1961-2		1963-4		1966-7		1961-2		1963-4		1966-7	
	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
UN-PU	NA	-	$1247	17	$1542	20	9,338	60	10,673	56	13,204	61
UN-PT	NA	-	1138	90	1558	97	7,772	64	8,443	63	9,331	63
FY-PU	NA	-	735	47	999	43	2,094	106	2,590	97	3,665	86
LA-NS	NA	-	665	101	645	127	1,284	111	1,472	107	1,816	119
LA-R	NA	-	455	174	373	181	869	72	936	72	1,135	69
JC-PU	NA	-	408	85	792	49	1,165	79	1,286	74	1,652	71
JC-PT	NA	-	739	104	723	149	325	123	328	129	473	125

[a]No values available for 1961-2.

Source: See Table 5-1.

TABLE 4-4 (Continued)

No. of Schools	EX 64[a]		FTEE		L.S.[b]		FT/Total		Males/Total		Grad/Total	
	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
Liberal Arts--Religious												
11	702	20	1,105	67	4.3	18	.73	24	.38	108	.04	259
16	851	3	1,417	59	4.3	21	.73	36	.44	83	.02	223
12	940	3	1,223	45	4.4	17	.67	37	.42	84	.05	144
11	1,053	3	822	101	4.1	19	.73	35	.25	140	.02	219
12	1,159	3	826	55	3.8	21	.81	22	.26	122	.04	224
12	1,248	3	746	38	4.1	19	.75	37	.19	169	.01	321
6	1,358	2	908	25	3.2	12	.79	18	.41	71	.01	224
7	1,475	4	627	82	3.7	24	.71	43	.16	156	.02	245
9	1,816	7	878	60	3.4	24	.88	18	.31	118	.07	186
7	2,573	18	209	124	4.4	24	.45	78	.10	205	.13	210
Junior Colleges--Public												
8	422	19	880	107	NA	-	.58	37	.56	36	00	-
5	542	4	1,373	35	"	-	.47	21	.64	21	"	-
6	739	4	1,291	44	"	-	.47	23	.68	13	"	-
5	844	1	2,200	64	"	-	.66	38	.78	62	"	-
4	954	4	1,705	52	"	-	.69	39	.78	9	"	-
5	1,040	2	836	25	"	-	.62	35	.66	8	"	-
4	1,202	5	989	71	"	-	.77	42	.71	23	"	-

noted for all four-year and two-year private institutions and public two-year colleges; as the mean enrollment (FTEE) interval value increased, educational operating expenditures decreased (Table 4-7). This activity is distinctly illustrated in Graphs 1D to 1G.

A word of explanation regarding the graphs (4-1A to 4-1G) may be helpful to the reader at this point. Totally, there are five interval curves for each class and they can be identified by abbreviation and type of line. They include:

1. Mean Set Interval Enrollment (FTEE) and Educational Operating Expenses Per Student (EX 64).--This is the only curve with dotted line and is read from the right hand vertical scale.
2. Mean Set Interval Enrollment (FTEE) and Instructional Costs Per Student (INST) as a Percent of EX 64.--This and all other interval curves (2 through 5) are a solid line and are read from the left hand scale.
3. Mean Set Interval Enrollment (FTEE) and Administrative Costs Per Student (ADMIN) as a Percent of EX 64.--See Item 2 for explanation.
4. Mean Set Interval Enrollment (FTEE) and Plant Operating Costs Per Student (PO) as a Percentage of EX 64.--See Item 2 for explanation.
5. Mean Set Interval Enrollment (FTEE) and Library Costs Per Student (LIB) as a Percent of EX 64.--See Item 2 for explanation.

TABLE 4-9 (Continued)

Decimal Change in FTEE Intervals[b,c]	No. of Schools	Decimal Change in FTEE[b,d]		Decimal Change in Costs[b,d]		Growth Ratio[e]
		$\bar{X}$	CV	$\bar{X}$	CV	
.25 to .299	3	.266	4	.466	84	1.8
.35 to .399	5	.356	5	.250	41	0.7
.40 to .549	3	.425	4	NA	8	NA
.55 to .751	2	.653	15	.601	34	0.9
Over .751	1	1.447	0	.786	0	0.5
Junior College--Private						
-.45 to -.001	10	-.187	-78	.083	211	-0.4
.00 to .049	7	.023	71	.122	114	5.3
.05 to .099	7	.083	19	.146	NA	1.8
.10 to .199	6	.139	20	.227	NA	1.6
.20 to .249	3	.221	1	.338	61	1.5
.25 to .299	2	.256	1	.341	72	1.3
.30 to .399	3	.331	8	.412	101	1.2
.60 to .699	2	.641	3	.271	74	0.4
.70 to .799	3	.772	3	.429	54	0.5
Over .80	1	1.031	0	.561	0	0.5

[a]Adjusted for price using consumer price index; 1961-2=.922.

[b]"Change in" is defined as the difference in enrollment (FTEE) (or total educational operating expenditures [TX]) in 1964 compared with 1962, divided by the 1962 figure.

[c]The intervals of the change (expressed in decimals) in FTEE were selected by inspection. The attempt was to keep data in units of 05.

[d]Decimal change may be changed to percentage change by multiplying by 100.

[e]Growth Ratio--change in educational operating expenditures divided by the change in full-time equivalent enrollment by set.

NA--Values open to question, not used. Source: See Table 4-1.

TABLE 5-2

THE RATIO OF PLANT VALUE TO EDUCATIONAL OPERATING EXPENSES FOR NORTHEAST REGION INSTITUTIONS, 1961-2, 1963-4, AND 1966-7 BY TYPE AND CONTROL

Type and Control	Ratio of Plant Value to Educational Operating Expenses[a]		
	1961-2	1963-4	1966-7
UN-PU	4.2	4.2	3.8
UN-PT	4.0	4.0	3.7
FY-PU	4.9	5.2	3.4
LA-NS	4.4	4.3	4.5
LA-R	7.2	6.9	6.1
JC-PU	4.1	4.2	2.9
JC-PT	9.8	9.3	7.2

[a]No adjustment for price changes was used. In a companion study, using adjusted data in Table 6-1, results were comparable with slight differences in values but not trend.

Source: See Table 5-1

between types of institutions. The relative value of plant per student (FTEE), by control of institution, is comparable on a relative basis with educational operating expenses per student (FTEE). That is, the value of plant per student (FTEE) in the private sector ranged from 50 percent more for universities, to 75 to 100 percent more in the private four-year institutions, and to over 200 percent more in private junior colleges when compared with their counterparts in the public sector. The plant value to educational operating expenses ratio was comparable, by class, only in the university sector. In

TABLE 5-8

SELECTED RATIOS OF EDUCATIONAL AND PLANT COSTS FOR THE NORTHEAST REGION INSTITUTIONS BY TYPE AND CONTROL FOR SELECTED YEARS[a]

Type and Control	Total Plant Cost[b] /Total Educational Cost	Total Educational Cost/[b] EX 64
UN-PU	.234	1.10
UN-PT	.248	1.10
FY-PU	.242	1.12
LA-NS	.244	1.09
LA-R	.311	1.19
JC-PU	.185	1.13
JC-PT	.344	1.25

[a]Table may be interpreted for Public Universities as follows: 23.4 percent of all costs which may be allocated to the instructional function, operating, and plant costs, are for physical plant use. Educational operating costs are increased by 10 percent if the yearly cost of plant is considered.

[b]Total Plant Cost includes Plant Operating Cost, Yearly Depreciation Cost and Yearly Interest Cost (1963-4). Total Educational Cost includes Educational Operating Cost plus Depreciation and Interest Cost (1963-4).

Source: See Table 5-1 for sources of data.

24 percent in the remaining four classes. Yearly plant costs, on the other hand, add 19 percent to private junior college costs, 25 percent in the religiously controlled liberal arts colleges, and from 9 to 13 percent in the remaining five sets. Yearly plant fixed costs, in these two classes, have the highest plant value to operating expenditure ratio. As might be expected, the total yearly plant

colleges where both factors reduced costs, in public universities where additional graduate students decreased costs, and in private junior colleges where the addition of males decreased costs, all of which are evident in Table 4-3.

TABLE 4-3

BETA COEFFICIENTS AND CONSTANT FACTOR FOR THE MULTIPLE REGRESSION EQUATIONS WHERE EDUCATIONAL OPERATING EXPENSES/FTEE IS A FUNCTION OF THE ENROLLMENT MIX FOR NORTHEAST REGION INSTITUTIONS OF HIGHER EDUCATION, 1963-4[a]

Type and Control	Constant Factor (in dollars)	Regression Equation Beta Coefficients (values in dollars)				
		FTEE	LS	FT/ Total	Male/ Total	Grad/ Total
UN-PU	-1513.87	.05	521.76	12.47	.51	-10.48
UN-PT	188.35	.01	-347.21	13.59	13.06	24.67
FY-PU	1677.15	.03	-211.09	6.60	-7.35	-3.13
LA-NS	1247.45	-.05	-242.89	14.64	.16	24.08
LA-R	2056.06	-.28	-84.30	-3.29	.51	.40
JC-PU	375.01	.01	NA[b]	3.59	2.47	--
JC-PT	1587.17	-.54	NA[b]	-.71	-.22	--

[a]Each beta coefficient may be thought of as the amount educational operating expenses per student are increased by adding one unit of that particular variable while holding all other staffing ratios constant. See Table 4-1 for interpretation of variables.

[b]NA denotes not available.

Source: See Table 4-1 for data sources.

Data was also reviewed by set intervals based on educational operating costs/FTEE in Table 4-4. Results were again consistent with those in Chapter 3 but more revealing; operating costs increased, as

It was concluded that the procedure of partialing out the effect of the student-to-faculty ratio to aid in the identification of least cost levels of enrollment (FTEE), is incorrect. In neutralizing the student-to-faculty ratio, the effect of the non-instructional professional wage segment was also partialled out. Since these two items comprise over 75 percent of educational operating expenditures per student (FTEE), there appeared little consistency in the remaining costs and enrollment (FTEE). No further analysis was considered using this approach.

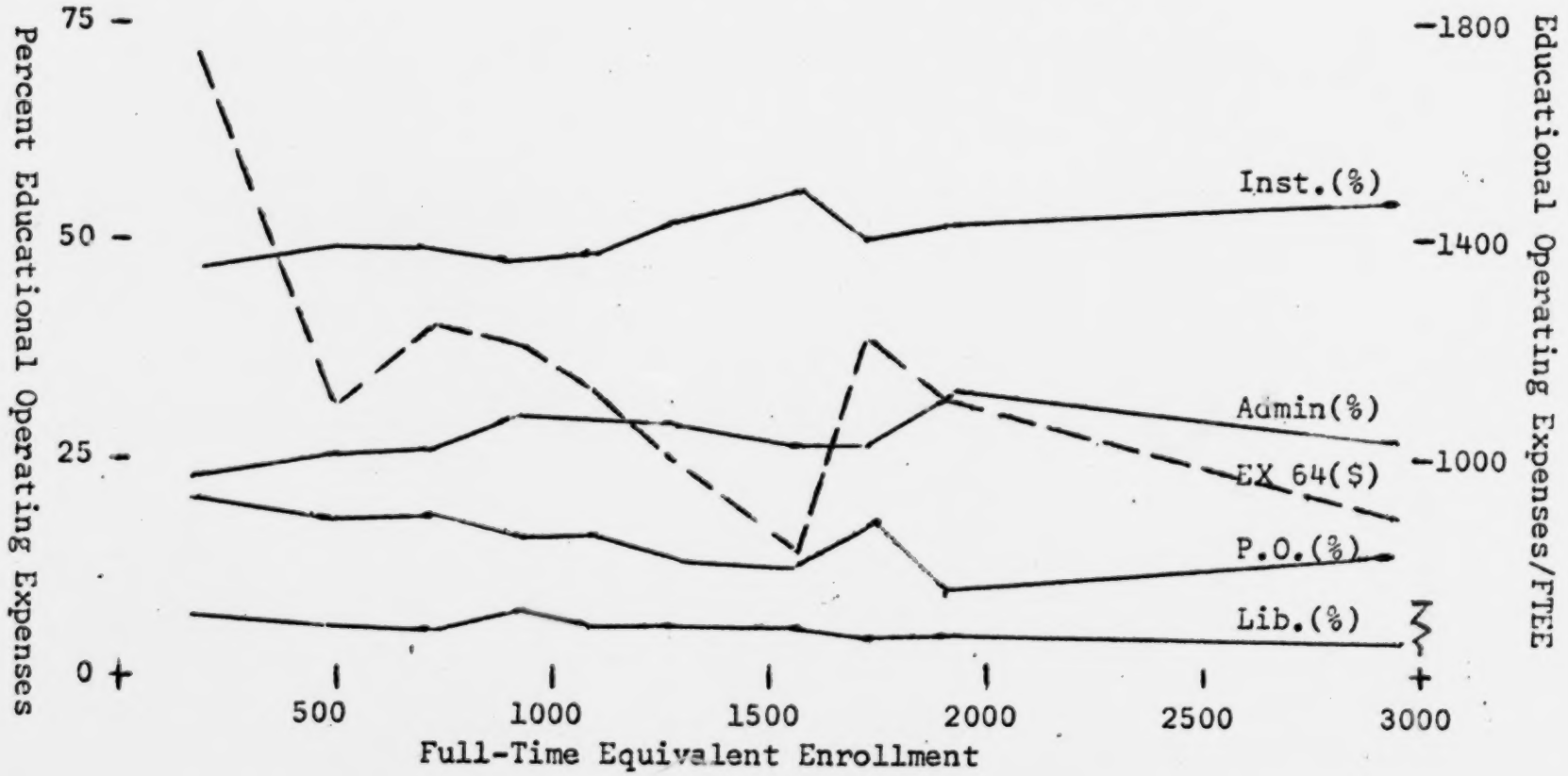
Educational Operating Cost--Its Component and Enrollment (FTEE)

Research in Chapter 2 has suggested that educational operating expenditures per student (FTEE) rise to meet available revenue. The purpose of this section is to explore the magnitude of educational operating costs per student at different levels of enrollment (FTEE) by class and type of institution.

It is generally recognized, for a given institution, that once a set of operating parameters (student-to-faculty ratio, students-to-administrator ratio, number of hours plant will be used, number of graduate to under-graduate students, etc.) have been established, a least cost level of enrollment can be determined through operations analysis. The work of George Weathersby for the University of California, The Development and Application of a University Cost Simulation Model, mimeographed June 15, 1967, is one such effort. Few, if any,

GRAPH 4-1E

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, 1963-4, RELIGIOUSLY CONTROLLED LIBERAL ARTS COLLEGES[a]



[a]See Graph 4-1A for reading instructions.

Source: Table 4-7.

coefficients, for both measures of growth in all classes but private universities, were very strong. Considering that there is a moderate linear one-to-one relationship between the two, it is probable that the relationship between the growth rates is non-linear. Costs in all private institutions, except junior colleges, increased at a higher rate. At the same time, enrollment in public institutions increased at least twice the rate of their counterparts in the private sector, a trend that has continued up to the present.[1] The inability,or unwillingness, of private schools to absorb additional students may be a reflection of a number of factors: a restrictive admission policy, small physical plant size or limited capacity, and/or the lack of operating revenue to cover the increased institutional deficit (subsidy).

Looking beyond mean class values to the set interval analysis, based on enrollment growth, mixed results were observed (Table 4-9). In all classes, it was discovered that the growth ratio fell with increments in enrollment. For example, when the two-year enrollment growth rate was less than .15, it was probable that educational operating expenses increased by .30 or more. The growth ratio, in this instance, would exceed 2.0. Changes in enrollment, above .15 but less than .30, had growth ratios between 1.0 and 2.0, suggesting that the decimal change in educational operating expenses was no more than twice that of enrollment growth. With an enrollment growth rate of .30 or more, the

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, Opening Fall Enrollment, 1968, Washington, D.C., U.S. Government Printing Office, Washington, D.C., 1969.

on the basis of data reported in Table II-3 of Appendix II. It illustrates that the value of plant is understated by about 40 percent in the public sector, while approximately the same percent of plant investment is used for purposes other than academic or general use. In the private sector, plant value was 50 percent lower than market value, which is approximately the same as the share of plant investment (50 percent) devoted to academic and general use. Therefore, the value of plant investment is understated by the same amount that the percent of plant value attributed to academic and general use is overstated. Accordingly, the value of plant can be used as a crude approximation of the amount of plant allocated for instructional purposes.

The methodology will be similar to that used in previous chapters, with one exception: the ratio of plant value to educational operating expenses. The larger the ratio, the more inefficiency in plant use. Cross section or class comparisons will be made within Fiscal Year 1964, as well as time comparisons over the three fiscal years.

The Relationship Between Educational Operating Expenditures and Plant Value

The relationship between plant value and educational operating expenditures was studied by institutional type and control as well as over time: Fiscal Years 1962, 1964, and 1967. Within each time period, class differences were observed in the absolute value

ment for price.[1] The ratio of plant value to educational operating costs fell in all three sets. Educational operating costs per student (FTEE) increased in absolute terms, but fell when adjusted for price during this period. Additionally, the operating subsidy per student (FTEE) fell, as did net tuition. The relative change in net tuition and the operating subsidy can be viewed through the ratio of costs to tuition (Table 3-4 and Table 3-5). Generally, when students paid a larger share of their educational operating costs per student, as evidenced by the lower ratio of cost to tuition, plant appears to be used more effectively. This pattern was observed in all classes, except level one of private universities and non-sectarian liberal arts colleges, although it varied in degree. The variation measures in Table 5-5 are moderate to weak, but are rather consistent between the yearly sets of data.

The Total Cost of the Instruction Function per Student; Operating and Plant Costs

On a per-student basis, calculation of the total cost of the instructional function should include educational operating expenses and an adjustment for the yearly cost of plant in order to be complete. Traditionally, institutions of higher education have not considered yearly plant costs even though they are real costs incurred by the institution and related to the instructional function.

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[1]With an adjustment for price, 1966-7 plant values would fall almost 10 percent.

student (FTEE) were more pronounced. In public and private universities, the curve for educational operating costs per student (FTEE), in the 6,000 to 9,999 and 14,000 to 17,999 enrollment (FTEE) intervals, was lower than in other intervals. The general trend of the cost curve was upward in both classes. This, as suggested earlier, may also be a demonstration of the positive movement of graduate students and enrollment in universities: .56 and .42 in public and private universities respectively. The components of educational operating costs also display some rather consistent trends. The relative share of library and plant operating costs decreased at higher enrollment (FTEE) intervals, regardless of the level of educational operating costs per student. It is also clear that as additional educational operating funds become available, they are prone to being spent on additional administrative services. For as educational operating costs per student (FTEE) rise, the percentage of those costs, accounted for by the administrative function, also rises. At the same time, the relative share of instructional costs fall. Generally speaking, the trend of the relative share of administrative and instructional costs was upward, over higher enrollment intervals, which is the opposite of the relative share of library and plant operating costs.

In all four-year institutions, the general behavior of the components of educational operating costs was similar to that observed in universities. Again, the relative share of administrative costs coincided with educational operating costs per student (FTEE) on a

The trend of the educational operating costs per student (FTEE) curve, in the public and private universities and public four-year colleges was mixed, but a slight positive trend was suggested over all intervals. Institutions under public control are a special case. States tend to distribute funds on a per student formula basis and they differ from state to state. This, in part, explains the upward direction of the curve. In private universities, as Table 4-4 indicated, expenditures increased along with the percent of graduate students. There is also a moderate one-to-one relationship (.41) between enrollment and the percent of graduate students in private universities. Considering these two findings, it is suggested that the upward movement of educational operating costs per student is due in large part to increased numbers of graduate students. The measures of variation for educational operating costs per student (FTEE) were strong in public institutions and moderately strong in all other classes.

Looking first at the relative share of the components of educational operating costs over enrollment (FTEE) intervals, we perceive a similar and consistent trend in all classes. The relative share of instructional and administrative costs mirror each other, while the relative share of library and plant operating costs fall slightly, over increasing enrollment (FTEE) intervals. The movement of educational operating costs per student (FTEE) also coincides with the movement of the relative share of administrative costs over the same enrollment (FTEE) intervals, although movements of educational operating costs per

Four-Year--Public

6	511	6	1,449	45	4.7	10	.54	7	.45	25	.19	102
9	647	5	1,570	72	4.7	10	.75	30	.41	26	.11	130
6	738	3	2,187	51	4.5	11	.78	21	.47	23	.05	114
8	850	4	2,641	39	4.9	7	.74	20	.40	23	.15	101
5	947	4	2,510	38	4.6	8	.70	26	.44	8	.10	65
7	1,057	3	2,872	142	4.5	11	.81	30	.41	16	.03	207
6	1,166	2	4,756	108	4.5	17	.68	34	.45	20	.07	100
3	1,241	1	3,550	10	4.0	20	.80	3	.36	10	.11	59
4	1,348	2	2,194	12	4.5	11	.78	7	.39	17	.09	48
4	1,584	12	2,275	29	3.5	32	.78	6	.36	35	.12	54

Liberal Arts--Non-Sectarian

3	660	9	1,582	26	3.7	51	.53	6	.76	10	.11	141
6	899	7	2,966	87	4.2	16	.63	34	.60	25	.02	156
6	1,084	6	3,311	96	4.2	16	.67	42	.49	49	.14	84
5	1,310	3	1,120	39	3.4	30	.89	20	.68	26	.00	--
10	1,458	3	1,076	52	3.8	28	.83	22	.68	34	.04	125
10	1,718	3	1,084	65	3.2	41	.94	4	.55	51	.04	170
4	1,882	3	916	36	3.3	13	.98	1	.15	170	.00	00
11	2,262	6	1,090	58	2.7	44	.88	27	.34	115	.10	163
5	2,733	7	1,049	52	1.6	31	.97	4	.12	189	.08	99
5	3,448	11	1,033	15	1.6	50	.95	5	.80	45	.10	117

TABLE 4-6

SIMPLE LINEAR CORRELATION COEFFICIENTS (R) FOR TOTAL AND COMPONENT EDUCATIONAL OPERATING EXPENSES/FTEE AND FTEE, BY TYPE AND CONTROL FOR NORTHEASTERN REGION INSTITUTIONS, 1964.

Type and Control	Correlation Coefficients Per Expense Item Per Student[a]				
	Admin.	Inst.	Lib.	P.O.	EX 64
UN-PU	.32	-.03	-.21	.09	.08
UN-PT	-.09	.19	-.06	-.11	.04
FY-PU	.26	.22	-.09	.02	-.20
LA-NS	-.34	-.22	-.26	-.27	-.30
LA-R	-.20	-.31	-.30	-.39	-.36
JC-PU	-.07	.15	-.36	-.01	-.04
JC-PT	-.22	-.35	-.39	-.20	-.36

[a]Admin.--administrative costs/FTEE
Inst.--instructional costs/FTEE
Lib.--library costs/FTEE
P.O.--plant operation costs/FTEE
EX 64--educational operating expenses/FTEE

Source: See Table 4-1 for data sources.

religiously controlled four-year and private junior colleges.[1] Further, in Table 4-3, it was discovered that in both of these classes, as well as in the non-sectarian liberal arts colleges, the addition of students (FTEE) reduced educational operating costs per student. Additions of students in private universities have an almost neutral or zero effect. In the set interval analysis, based on enrollment, the same trend was

[1]Public universities were not included because of the small number of institutions included in the study.

TABLE 4-9 (Continued)

Decimal Change in FTEE Intervals[b,c]	No. of Schools	Decimal Change in FTEE[b,d]		Decimal Change in Costs[b,d]		Growth Ratio[e]
		$\bar{X}$	CV	$\bar{X}$	CV	
Liberal Arts--Non-Sectarian						
-.061 to -.001	5	-.027	75	.162	130	-6.0
.00 to .019	6	.006	101	.140	154	NA
.02 to .049	8	.035	28	.141	42	4.0
.05 to .099	16	.071	18	.228	54	3.2
.10 to .149	9	.116	11	.191	89	1.7
.15 to .199	6	.170	10	.381	82	2.2
.20 to .249	5	.221	8	.430	72	1.9
.25 to .299	4	.281	4	.557	62	2.0
.35 to .399	2	.363	2	.420	28	1.2
.40 to .999	2	.710	30	.161	25	.2
Liberal Arts--Religious						
-.158 to -.051	5	-.107	34	.162	136	-1.5
-.05 to -.001	8	-.027	27	.177	36	-6.6
-.00 to .049	22	.032	38	.195	60	6.1
.05 to .099	12	.070	26	.240	48	3.4
.10 to .149	14	.125	10	.276	58	2.2
.15 to .199	13	.169	7	.258	50	1.5
.20 to .244	7	.228	7	.330	49	1.4
.30 to .399	4	.332	5	.368	40	1.1
.40 to .499	2	.440	2	.195	NA	0.4
.50 to .808	2	.703	11	.695	NA	1.0
Junior College--Public						
-.23 to .031	2	-.133	-75	.095		.7
-.03 to .009	2	-.004	NA	.137	34	NA
.01 to .099	2	.072	15	.422	53	5.9
:10 to .149	7	.125	12	.468	56	3.7
.20 to .249	3	.233	4	.302	73	1.3

TABLE 5-7

TOTAL EDUCATIONAL, TOTAL PLANT, PLANT OPERATING, DEPRECIATION, AND INTEREST COSTS PER FTEE FOR NORTHEAST INSTITUTIONS BY TYPE AND CONTROL, 1968-4[a]

Type and Control	Plant Operating Cost/FTEE	Yearly Depreciation Cost[b]	Yearly Interest Cost/FTEE[c]	Total Plant Cost/FTEE[d]	Total Educational Cost/FTEE
UN-PU	$230	$119	$ 27	$376	$1,615
UN-PT	340	128	92	560	2,352
FY-PU	130	86	27	243	1,047
LA-NS	281	110	90	481	1,976
LA-R	226	124	102	452	1,452
JC-PU	86	55	20	161	824
JC-PT	236	179	165	580	1,688

[a]Table may be interpreted by referring to Public Universities as follows, by column:

1. Plant operating costs per student amount to $230.00 per year.
2. Plant value is estimated to wear out at a yearly rate of $119 per student.
3. It is estimated that it costs $27.00 per student to pay the rent on borrowed funds.
4. The sum of items in the first three columns is equal to Total Plant Costs per student ($376).
5. Educational operating cost ($1469) plus the yearly depreciation cost ($119) and yearly interest cost ($27) is equal to Total Educational Costs ($1615) per student (FTEE).

[b]Estimated by using values developed in Appendix II.

[c]Determined by applying factors in Appendix II to Class Plant Value.

[d]Total Plant Costs equal Plant Operating, Yearly Depreciation, and Yearly Interest cost per student.

Source: See Table 5-1 for sources of data.

TABLE 5-1

A COMPARISON OF PLANT VALUE AND EDUCATIONAL OPERATING COSTS PER STUDENT (FTEE) FOR NORTHEAST INSTITUTIONS BY TYPE AND CONTROL, 1961-2; 1963-4; 1966-7 ADJUSTED FOR PRICE 1963-4=100.0

Type and Control	Plant Value/FTEE[a]						Educational Operating Expenses/FTEE[b]					
	1961-2		1963-4		1966-7		1961-2		1963-4		1966-7	
	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
UN-PU	5,845	35	6,150	31	6,153	32	1,431	17	1,469	20	1,581	16
UN-PT	7,770	68	8,506	66	9,016	69	2,000	46	2,132	46	2,381	52
FY-PU	4,355	68	4,828	70	3,857	66	924	21	934	32	1,097	33
LA-NS	7,150	64	7,554	101	8,180	60	1,700	49	1,776	42	1,814	42
LA-R	7,900	115	8,523	52	7,503	87	1,160	51	1,226	40	1,208	32
JC-PU	2,810	63	3,262	73	2,758	82	713	31	772	32	930	NA
JC-PT	13,100	159	12,442	126	10,910	139	1,380	60	1,344	50	1,486	60

[a]Plant value is adjusted for price changes with the following indices: 1961-2=.957; 1963-4=100.0; 1966-7=109.5.

[b]Educational operating expenses adjusted for price changes using the following indices: 1961-2=.922; 1963-4=100.0; 1966-7=111.5.

Source: U.S. Department of Health, Education, and Welfare, Office of Education, "Higher Education General Information Survey"; 1961-2; 1963-4; 1966-7; unpublished data.

TABLE 4-4

A SET SUMMARY BASED ON EDUCATIONAL OPERATING EXPENSES PER STUDENT FOR SELECTED CHARACTERISTICS OF THE ENROLLMENT MIX FOR NORTHEAST REGION INSTITUTIONS BY TYPE AND CONTROL, 1963-4

No. of Schools	EX 64[a]		FTEE		L.S.[b]		FT/Total		Males/Total		Grad/Total	
	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV	$\bar{X}$	CV
Universities--Public												
4	$1,221	3	10,443	52	3.3	13	.56	24	.66	9	.14	56
2	1,474	4	5,619	26	3.0	0	.77	28	.66	6	.19	17
2	1,582	0	14,001	15	3.5	14	.74	28	.47	25	.17	32
2	1,947	3	11,962	68	3.5	14	.88	9	.67	2	.10	3
Universities--Private												
4	885	9	8,107	39	4.3	10	.57	17	.73	19	.15	59
6	1,303	10	8,900	46	3.1	28	.56	24	.65	11	.30	13
5	1,970	5	6,060	72	2.2	34	.77	16	.79	20	.30	16
6	2,323	6	9,439	79	2.3	32	.54	25	.79	14	.39	33
4	3,261	6	8,555	62	1.2	35	.78	25	.79	22	.36	52
3	3,903	3	9,804	39	1.0	0	.97	2	.88	12	.38	37

have attempted to analyze a number of institutions in this manner. Needless to say, the intent of the research reported in this section is not quite as ambitious as Weathersby's. However, an attempt has been made to identify, using broad enrollment (FTEE) intervals and the percentage of educational operating costs for each of the four components indicated, general trends in the pattern of educational operating costs per student (FTEE), by type and control of institution. One anticipated outcome of this effort is to determine whether educational operating costs per student (FTEE) vary at intervals or levels of enrollments (FTEE) by class of institution. Unfortunately, Table 4-6 indicates that the components of educational operating costs per student (FTEE), on a one-to-one basis with enrollment (FTEE), are generally poorly correlated; the components being: administrative, instructional, library, and plant operation costs. This is also true for educational operating expenses per student (FTEE) and enrollment (FTEE). For this analysis, the value of each component was calculated as a percent or relative share of educational operating costs at selected enrollment (FTEE) intervals. Each component measure then becomes an indicator of the importance of a given function compared with the other components of educational operating costs per student, for each enrollment (FTEE) interval.

It may be recalled, from Table 4-2, that the contribution of enrollment (FTEE) to variations in educational operating expenses per student was the strongest of all items in the enrollment mix, in

TABLE 4-9

A SET SUMMARY BASED ON ENROLLMENT GROWTH FOR GROWTH RATES OF OPERATING COSTS AND ENROLLMENT (FTEE) FOR NORTHEAST REGION INSTITUTIONS OF HIGHER EDUCATION BY TYPE AND CONTROL FOR PERIOD 1961-2 to 1963-4[a]

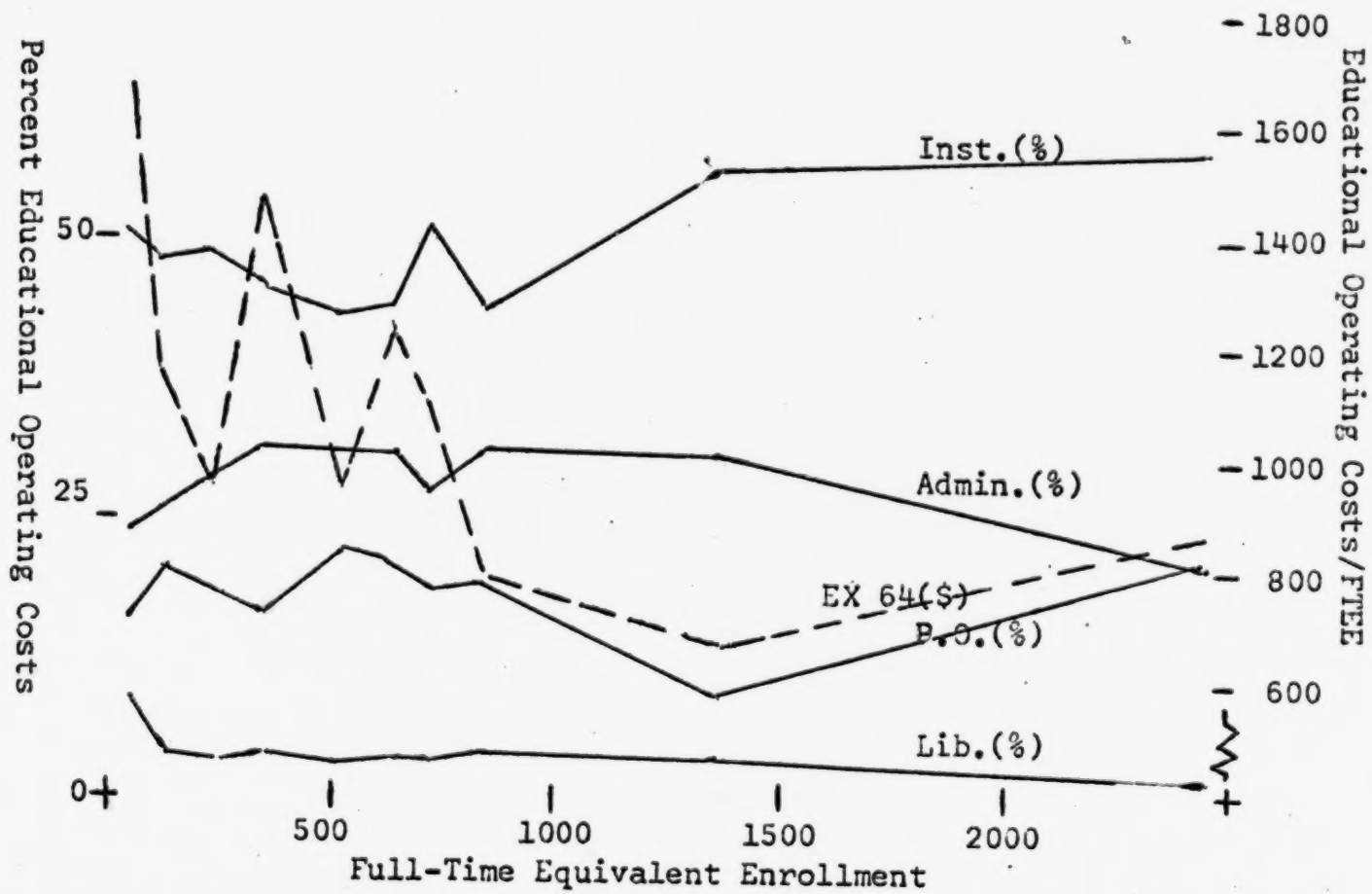
Decimal Change in FTEE Intervals[b,c]	No. of Schools	Decimal Change in FTEE[b,d]		Decimal Change in Costs[b,d]		Growth Ratio[e]
		$\overline{X}$	CV	$\overline{X}$	CV	
Universities--Public						
.05 to .099	4	.081	21	.222	35	2.7
.10 to .149	1	.105	0	.212	0	2.1
.15 to .199	2	.177	2	.127	17	0.7
.20 to .299	3	.278	2	.381	45	1.4
Universities--Private						
-.06 to .001	3	-.038	37	.130	90	-3.4
.00 to .049	7	.036	23	.169	48	4.7
.05 to .099	9	.071	19	.198	55	2.7
.10 to .149	5	.112	12	.258	27	2.4
.20 to .249	3	.219	5	.316	17	1.5
Over .25	1	.283	0	.278	-	1.1
Four-Year--Public						
-.05 to -.001	2	-.026	35	.177	9	-6.7
.05 to .099	2	.083	7	.098	47	1.2
.10 to .149	10	.128	9	.254	52	2.0
.15 to .199	9	.172	8	.296	83	1.7
.20 to .249	5	.226	4	.289	96	1.3
.25 to .299	13	.270	6	.327	57	1.2
.30 to .349	4	.319	3	.310	40	1.0
.35 to .399	7	.366	2	.397	100	1.1
.40 to .459	4	.425	5	.310	28	0.7
Over .46	1	.624	0	.597	0	1.0

(in dollars) of each measure and the ratio of plant value to educational operating expenses. Yet, over the three time periods (Table 5-1), there was little difference in the relative position of values among classes. Furthermore, the variation coefficients of each of the measures, by class, remained essentially the same over the three time periods; further evidence of the consistency in values on a relative basis. There was, of course, a change in the absolute value of each, on a per-student basis, but not in the same direction. Educational operating expenses per student (FTEE), fully adjusted for price change, increased upwards of 7 percent from 1961-2 to 1966-7. At the same time, plant value per student (FTEE) dropped in five of the seven classes; private universities and non-sectarian liberal arts colleges being the two exceptions. Institutions in these latter classes had the highest level of educational operating expenses per student (FTEE) of the seven classes. Contrasting movements in plant value and educational operating expenses are also visible when comparing yearly changes in the ratio of plant value to educational operating costs (Table 5-2). In the public sector, decreases were noted from Fiscal 1962 to Fiscal 1967, with the ratio falling 9 percent in universities to over 30 percent in two-year colleges. In the private sector, the ratio fell over 10 percent in all classes but non-sectarian liberal arts colleges, where it increased slightly. Much like educational operating expenditures per student (FTEE), there are rather significant differences in plant value per student (FTEE),

Yearly plant costs are composed of two items: (1) the yearly cost of the depreciation of plant and equipment, defined as the dollar value of physical plant divided by the effective use, in years, and (2) the yearly interest cost--the cost of funds borrowed to finance the purchase of plant and equipment. Calculation of these costs has been discussed in some detail in Appendix II and need not be repeated here. Table 5-7 presents a set of values, by class, which includes all cost elements of the instructional function, and though they are approximations, they are revealing. The yearly plant cost per student, by class, displayed some consistency among private institutions, as costs ranged from $452 to $580 per year. Total educational costs per student display no such consistency. Yearly plant costs per student ranged from 100 to 300 percent more, in private institutions, than their counterpart class in the public sector (Table 5-7). Ratios developed from the data in Table 5-7 are much more revealing, as observed in Table 5-8. Two different ratios have been calculated with comparable results. One considers the ratioof total plant cost (depreciation, interest, and operating costs) to total educational costs (educational operating costs plus plant depreciation and interest cost). The other ratio compares total educational cost with educational operating costs. In the former ratio, the values ranged from 18 percent of total educational costs in public junior colleges to roughly 32 percent in religiously controlled liberal arts and private two-year schools, and about

GRAPH 4-1G

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, 1963-4, PRIVATE JUNIOR COLLEGES[a]

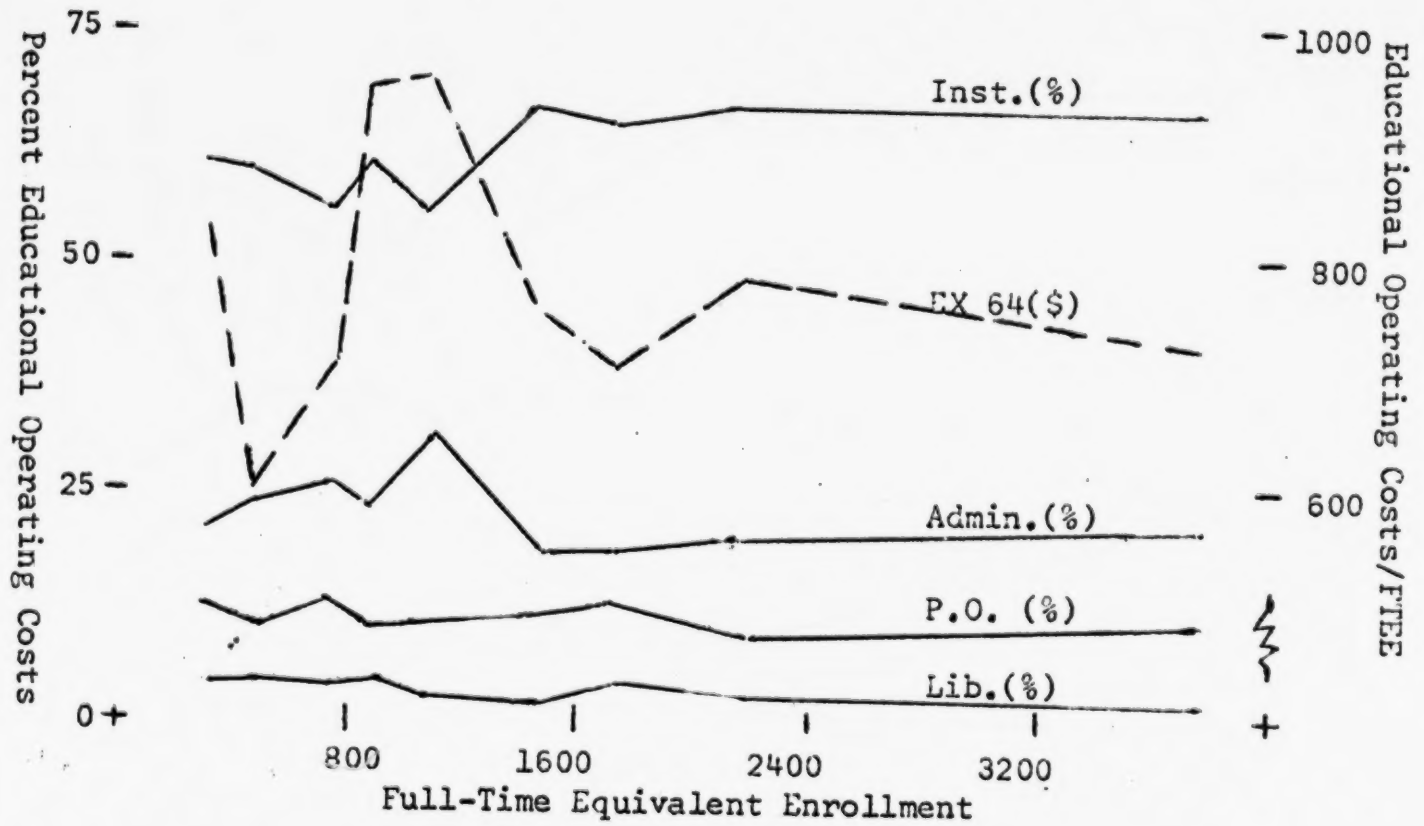


[a]See Graph 4-1A for reading instructions.

Source: Table 4-7.

GRAPH 4-1F

A COMPARISON OF EDUCATIONAL OPERATING EXPENDITURES AND THE COMPONENTS OF EDUCATIONAL OPERATING EXPENDITURE FOR SELECTED RANGES OF ENROLLMENT FOR THE NORTHEAST REGION, 1963-4, PUBLIC JUNIOR COLLEGES[a]



[a]See Graph 4-1A for reading instructions.

Source: Table 4-7.

Religiously controlled and private junior colleges generally had low student enrollment. Additional students would reduce the ratio of plant value to operating expenses, in line with the other classes. However, this means a greater burden on the institution in terms of educational operating subsidy. In general, all groups of institutions keep enrollment at the level they can effectively subsidize; that is, the difference between net tuition collections and educational operating costs, regardless of plant utilization.

In dollar amounts, plant value per student (FTEE) fell from 1963-64 to 1966-67, except in the "higher level" selective private institutions. At the same time, educational operating expenditures per student (FTEE) increased in all classes. As a result, the ratio of plant value to educational operating expenses fell in all classes but one. The movement of the absolute value of plant and educational operating costs, along with the increase in enrollment, resulted in a more intense use of plant in 1966-67 compared with 1963-64. Generally, but in the less selective institutions in particular, a major share of the additional financial burden imposed upon an institution by increased enrollment is passed on to all students. This was indicated in Chapter 3 in the analysis of the operating subsidy. Along with this trend, the net return to the student on tuition ratio fell from 1963-64 to 1966-67. Therefore, to suggest that because an institution had physical plant space available, it can add additional students (at least in the less selective or low educational operating

SUMMARY

The analysis indicates that there are two identifiable relationships between plant value and educational operating costs. One is for all public institutions and the more selective private institutions, and another is for the less selective private institutions. This relationship can also be identified in the private sector, by the class of institution. More specifically, private universities and non-sectarian liberal arts schools in the Northeast include most of the "upper level" selective institutions, while religiously controlled liberal arts schools and two-year private schools contain most of the "lower level" selective private institutions. In the first group, public institutions and highly selective private schools, the ratio of plant value to educational operating costs, although differing in mean dollar value, nonetheless averaged 4.3 in 1961-62 with a range of 0.9 for the group. In 1966-67, the mean dropped to 3.7 while the range for the group increased to 1.4. The ratio, however, fell in six of the seven classes of institutions in the study between Fiscal 1964 and Fiscal 1967. In religiously controlled liberal arts colleges and private two-year schools, high plant value per student (FTEE) was contrasted to relatively low educational operating costs per student (FTEE). The ratio of plant value to operating costs, for each class, was from 33 to 150 percent higher than the other classes.

higher, but in addition, they have twice the amount of faculty available to students than the less selective institutions.

3. Gross tuition was highest in the most selective schools. However, net tuition, which is gross tuition less (-) student aid, was lower in the more selective institutions than in many of the least selective institutions.

4. The return to the student on his educational investment, for each dollar of net tuition invested, was higher in the more selective public and private institutions. Furthermore, chances are that the lower ability level student, particularly in private institutions, paid more in real dollars to attend an institution while receiving less in educational resources.

5. Over the 1964 to 1967 Fiscal period, there was some upward movement in the level of selectivity in some institutions, without a corresponding increase in the level of educational operating expenses per student (adjusted for price changes).

6. Those institutions which increased their levels of educational operating expenditures per student, from Fiscal 1964 to 1967, required the students to carry a larger share of their educational operating expenditure.

7. The more selective institutions had the highest plant value within each class.

8. From Fiscal 1964 to 1967, the value of physical plant per student (FTEE) decreased in public institutions and many private

schools. The only exceptions were the most selective private universities and non-sectarian liberal arts colleges.

9. Increases in enrollment (FTEE), from Fiscal 1964 to 1967, occurred primarily in the public sector and in some of the less selective private institutions.

10. Overall, there was little change in the relative share of resources by selectivity level of institution, over the two periods: the same financial and staffing imbalances remain and are perhaps even more pronounced in the absolute sense, since increased enrollments were borne by the public and least selective private institutions.

11. Two academic market conditions seem to prevail in the Northeast Region: one for the public and highly selective institutions, particularly private universities and non-sectarian liberal arts colleges, and another for most religiously controlled liberal arts colleges, some of the less selective non-sectarian liberal arts colleges, and private junior colleges. In the case of public and more selective private institutions, the demand for spaces is so great that these institutions have no difficulty in filling available spaces. In this market, private institutions do not openly compete with one another on a price basis since gross tuition rates are similar. Yet, these schools (private, highly selective) do practice a subtle form of price discrimination since students pay different rates of tuition, the amount of difference depending on the availability of student aid funds and planned expenditures.

12. Net tuition collections, in highly selective schools, are not as important to current educational operating expenditures as is the availability of institutional wealth (operating subsidy).

13. In the less selective institutions, the demand and supply relationship is much more market oriented. These institutions will accept students up to the point where the net tuition is equal to operating expenditures. That is, as long as educational operating expenses can be covered, students will continue to be enrolled, assuming physical space is available. Net tuition is set at the level which the institution feels will draw the greatest number of students and cover the expected level of current educational operating expenditures.

14. The practice of expanding educational services if funds are available appears to be unavoidable if institutions intend to attract the most highly qualified students, as measured by the selectivity level of students. To attract these students, institutions need to expand student services, recruitment, and to a greater extent, fund raising through public and alumni relations activities, to say nothing of attracting more qualified staff. Unfortunately, resources are limited and it follows that only the more affluent institutions are able to provide these additional services. It can be likened to "priming the pump." That is, you need substantial funds initially to get additional resources.

The Implications

With allowances made for imperfections in the data and the methodology, nonetheless, there appear to be some important and consistent findings in the quantitative analysis, from which implications for the educational program may be drawn; some general, others more specific. Implications for the individual student, the institution and governments, State and Federal, will be discussed in that order.

The Individual Student

The student at the same level of ability (selectivity factors), grade (undergraduate or graduate), and attendance status (full-time or part-time), can expect that varying degrees of resources will be available to him, if the past is any indication of the future. Most of the additional students admitted to colleges during the past few years have enrolled in the public and less selective private institutions. Although expenditures for educational operations in these schools in Fiscal 1967 was slightly higher, in adjusted dollars, than in Fiscal 1964, the return to the student on his net tuition investment in educational operating expenses/FTEE was less than in Fiscal 1964. The implication is that students can expect to pay a larger share of the cost of education. Further, greater competition by students for admittance to the more affluent institutions allows some schools to attract higher levels of students without having to

make additional educational resources available. In Fiscal 1967, the student found that space was used more intensively, particularly in the public institutions. However, if he desired a small campus environment with plentiful space, but did not mind limited educational resources and high net tuition, there were institutions offering this type of educational experience. Except for the few academically elite, fortunate enough to be accepted into the more selective institutions, most students can expect to pay more and receive less in direct resource allocations for educational operations, if past trends in resource allocation continue and if there is no major breakthrough in innovative cost-saving teaching techniques. Unfortuantely, most of the innovations promoted in higher education today, such as experimental colleges, independent study programs and other[1] attempts to repersonalize the higher education experience, require more faculty and are perhaps even more expensive than current methods. The great challenge is to bring the student and faculty together within the bounds of limited resources. The success of the free university movement, with classes at off-beat times and in rather shabby surroundings, with student instructors on occasion, suggests that there are other ways which can be acceptable and successful.

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, "Workshop Conferences to Foster Innovation in Higher Education" Project # 6-2183, Contract # OEE-3-6-062183-0667.

Implications for the Institutions

Most of the findings in this study apply to the institution. Of the implications drawn from the findings, which apply to the organization and operation of colleges and universities, the most important are those which relate to fiscal operations. It is not suggested that economic rationale take precedence over academic philosophy, only that in considering institutional goals, the economic constraints must also be recognized. The availability of educational resources, physical and human, or as some suggest, the wealth of the institution, is an important consideration which must be taken into account when determining the type of student that might reasonably be expected to attend an institution.

Some of the findings in this work, which relate to economic efficiency, are probably not new to institutional researchers. Some institutions may also be aware of the relationships uncovered, particularly at the university level, and this may, in part, explain the reason for some of the consistencies. The more significant implications for all institutions are:

1. Library and plant operation costs, on a relative basis, decrease as enrollment increases. This suggests that small institutions, where possible, should attempt to cooperate or merge library and/or plant maintenance operations. While there has been movement in this direction in the area of library operations, there has been

less effort at the plant operations level. In the private sector particularly, it may be desirable for institutions in close proximity to form a college maintenance corporation and each contract with it for maintenance services. As part owner, each school would have a voice in the operation. The larger operation would provide more services, at the same, or lower per-student costs. Non-member institutions, such as public institutions, could also be serviced for a fee. The same suggestion applies to library operations. There is good reason to believe that library operations could be expanded while keeping costs down.

2. Institutions of less than 1,000 to 1,500 full-time equivalent students would do well to consider enrollment growth up to these levels. In adding to student enrollment, increases should be in the magnitude of about 30 percent over a two-year period or as near as possible to that amount.

3. Larger institutions should attempt to determine, by cost analysis, the existence and size of the enrollment modules unique to their institution. Those large institutions committed to the cluster college concept would do well to consider the relationship between the size of each college or school in the institution and the enrollment module. It may be advantageous for large institutions to combine the two concepts; a module, for example, would be made up of a number of cluster colleges, while a university would be composed of a number of modules. Precise figures can be attained

through linear programming techniques, which combine the academic and the economic constraints to a particular institution.

4. Institutional planners must be aware that they compete for students and faculty; human resources which are limited and expensive. They must expect to pay substantially the same, or more, than other institutions who are competing to attract these same resources. The methods include: student aid programs, increased faculty wages, more desirable faculty teaching assignments, and active research programs. Developing institutions striving for "excellence" must be aware that substantial amounts of income from sources other than student tuition needs to be attracted and available. Expenditures for the next year must be planned without depending on tuition collections as the margin of success. As the data indicate, the more successful institutions are those which contribute the most to the student in educational operating expenses.

5. Over a thirteen-year period, the relative shares of the components of educational operating costs have remained essentially the same. Given that the relative share of components vary when enrollment and educational operating costs per student are considered, nonetheless, there is little evidence, on a relative or absolute basis, that fewer funds are needed for faculty wages. In fact, given the current structure and operating philosophy of higher education, the only method available for doubling productivity and decreasing faculty wage costs per student, is to increase class

expenditures per student [FTEE] institutions) begs the real question. That is, the availability of a large amount of plant space per student may be an indicator of an institution's capacity to house additional students, but not its financial capacity to enroll such students.

In all but two classes, religiously controlled liberal arts and two-year colleges, yearly plant (fixed) cost (the yearly cost of plant depreciation and interest) was equivalent to 9 to 13 percent of educational operating costs per student (FTEE). In the religiously controlled liberal arts schools and private junior colleges, these costs ranged from 19 to 25 percent, further indication of the less efficient use of plant facilities.

Finally, if yearly plant costs per student are added to educational operating costs, the educational operating subsidy increases substantially, and the true financial burden per student on the institution becomes visible.

Much like the previous chapter, results of research reported in this section of the study have primarily been concerned with identifying consistency and explaining deviations in the funding patterns of institutions of higher education in the Northeast region. The time has arrived to draw together the results of the work in each chapter and discuss the implications for individual institutions and national and state planning agencies. This will be the purpose of Chapter 6.

CHAPTER 6

SUMMARY OF THE FINDINGS AND THE IMPLICATIONS

The purpose of this study has been to identify common cost patterns in institutions of higher education. The results will be available to college administrators for use as a guideline in planning and establishing an effective method of utilizing their financial, staff, and physical plant resources. In addition, findings will be valuable to state and federal government policymakers in identifying institutional educational resource requirements, in order that they may promote and effect legislation beneficial to public and private institutions of higher education.

The study concentrated on 362 institutions of higher education in the Northeast Region of the United States: Connecticut, Maine, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania Rhode Island, and Vermont. Fiscal 1964 data were used primarily, although data from Fiscal Years 1962 and 1967 were used extensively.

The Findings

It is not the objective of this Chapter to reproduce each Chapter Summary, but rather, to assemble the findings and relate them

to some broader issues which will be explored in the Implications Section.

The Distribution of Educational Operating Expenses Per Student (FTEE)

1. Universities usually spend more per student, for the instructional function, than do four-year institutions. Likewise, four-year institutions spend more than the junior colleges. On the whole, private institutions spent more than their public counterparts.

2. Students in public institutions could expect to contribute less toward their educational costs, while the supporting public agency contributed substantially more when compared to the sponsoring body of the corresponding class of private institution, in either time period.

3. In all but junior colleges, from Fiscal 1964 to Fiscal 1967, the relative cost comparisons remained uniform, but net tuition (the share of educational operating expenses that students were expected to pay) increased in absolute terms.

4. The institutional operating subsidy decreased from Fiscal 1964 to Fiscal 1967, in all but private universities and public junior colleges. Students in the other five classes could expect to receive less in return for each dollar of net tuition paid (or invested).[1]

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[1]No mention is made of "opportunity costs"; that is, the income forgone by the student while attending college, since the study relates to the institution and not the student. However, it is acknowledged that "opportunity costs" do exist and probably have increased during the period in question--1963-64 to 1966-67.

5. The ratio of educational operating expenses to total current expenses is indicative of the degree of non-instructional activity and/or services available to the student. Relative consistency was observed for Fiscal 1964 and 1967, with slight variation by type of institution. Specifically, more than half of the current funds in universities, two thirds in four-year colleges, and three-quarters in junior colleges, are used for the instructional function, over both Fiscal years, although the absolute values were falling, from Fiscal 1964 to 1967.

6. Over two time periods and by type of institution, the difference in net tuition receipts, between public and private institutions, is similar to the difference in educational operating expenses.

Educational Operating Costs Per Student and the Enrollment Mix

1. Increases in educational operating costs per student vary, by class of institution, when a single unit of an enrollment mix variable is added.

2. In those instances where the range of values for the enrollment mix are similar, some consistency in costs are visible. In private universities and non-sectarian liberal arts colleges, the unit costs for the selectivity level of student, the graduate to total student ratio, and to some degree, the full-time to total student ratios were similar. Religiously controlled liberal arts and private

two-year colleges had similar unit costs for enrollment (FTEE) and the full-time to total student ratio. These two sets can also be categorized as having the largest number of the most selective institutions, in the former case, and the least number in the latter case.

3. The two classes of institution which offer the least subsidy to their students are private two-year colleges and religiously controlled liberal arts colleges. They enrolled fewer part-time students even though these students reduce the average cost of instruction, as witnessed in the other classes of institutions.

4. Male students are more costly to educate than women, with the exception of those schools which have expensive programs traditionally designed for women such as: teaching and the social sciences.

5. When public institutions increased their enrollment, educational operating costs per student (FTEE) increased slightly, while in the private sector, the opposite trend was generally true. There was a definite downward trend in educational operating costs, in private four-year and two-year colleges, as enrollment increased (at least in the 1,000 to 1,500 enrollment range).

6. It appears to be less expensive to increase enrollment in large increments as opposed to gradual additions, in all institutions.

Educational Operating Expense
and Its Components

1. In Chapter 2, it was demonstrated that (from 1963-64 to 1966-67) the components of educational operating costs: administrative, instructional, plant operating, and library, experienced a slight change on a national basis. In both the public and private sectors, the relative share of administrative and library costs increased at the expense of plant operations. Instructional costs were the most consistent although the relative share rose slightly in the public sector and decreased in the private sector.

2. The general trends for the components of educational operating costs, on the national level, were similar to those noted in the Northeast Region, although the components, by type of institution, displayed unique values.

3. As the absolute level of educational operating expenditures per student (FTEE) rises, all of its components seem to share in the added affluence.

4. Evidence indicates that as enrollment rises, the relative share of educational operating costs needed for plant and library operations, regardless of the absolute dollar value of operating costs, decreases in all classes.

5. The relative share of educational operating costs per student (FTEE) allocated for the administrative function depends, to a great extent, on the dollar value of educational operating costs

Finally he admits the assumption of a single utility function for any institution may not be valid, particularly in the case of a university (51).

Jenny, reporting with partial results of a study of 43 liberal arts colleges in hand, suggests that instead of an economic optimization subject to constraints, a college tries to optimize its educational and general component, using either Seigel's utility function or some other easily defined educational benefit, subject to various constraints, some of which are economic in nature (28). His non-economic component includes capacity, enrollment, and/or calendar constraints. His inputs and outputs are essentially the same as Seigel's. (In this same vein Andre Daniere agrees with Jenny when he suggests in his argument for competition without the profit motive that optimization can be achieved. It is Daniere's belief that the precise results of profit competition can be attained under alternative sets of rules and motivations.)

Jenny also discusses the difficulty of attempting to determine the optimum price of the institution's available educational space, particularly because of the multiple (public, private, student, and non-student) income sources. He points out that each of the sources represents a more or less independently managed balance sheet, in reality an independent input-output set (28). And, thus, price or tuition is a function of the planned enrollment and of the

total cost per student not covered by any of the other regular income elements. In the long run the tuition charged is determined as a residual item designed to balance the planning budget. Jenny also suggests granting of scholarships is a form of price discrimination (28).

APPENDIX II

ON THE CALCULATION OF YEARLY DEPRECIATION AND INTEREST COST FOR PHYSICAL PLANT FACILITIES, FISCAL 1964, NORTHEAST REGION INSTITUTIONS OF HIGHER EDUCATION BY TYPE OF INSTITUTION

The yearly cost of the instructional function, on a per-student basis, must include not only educational operating expenses, but also the yearly cost of plant: depreciation cost and the cost of funds borrowed for plant (yearly interest cost).

Depreciation Costs

Depreciation is considered to be the amount, or value, that plant or equipment wears out each year with an adjustment for current replacement cost. There are four categories under which physical plant is classified by the U.S. Office of Education. They include:

1. Building value
2. Land value
3. Value of improvements to land
4. Value of equipment

Buildings and improvements, based on the opinions of three specialists, can be depreciated on a straight-line 50-year life basis

(1.00/50 = .02), while equipment is considered to have a 20-year life basis (1.00/20 = .05). Land is assumed to remain constant in value. If there is a change in land value, it is probably positive. However, no adjustment will be made in either direction. The three specialists mentioned in this paragraph as authorities are:

1. Dr. Eugene Higgens, Higher Education Facilities Specialist, National Center for Educational Statistics, U.S. Office of Education, Washington, D.C.
2. Mr. Benson Dutton, Office of Construction Service, U.S. Office of Education, Washington, D.C.
3. Mr. Thomas Hallenbach, Education Specialist, American Institute of Architects, Washington, D.C.

A number of institutions combined the value of buildings and land or land and improvements in their report to the Office of Education. Therefore, it will be necessary to derive a depreciation factor (Dj) which can be applied to total plant value to obtain yearly plant cost. Fortunately, a physical facilities survey was compiled in 1958 by the U.S. Office of Education which, when compared with preliminary unpublished data from the 1965-66 Higher Education General Information Survey of the U.S. Office of Education,[1] is adequate to devise a depreciation factor (Dj, where j = 1 thru 6), for each of the following groups in the Northeast Region:

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[1] U.S. Department of Health, Education, and Welfare, Office of Education, Inventory of College and University Facilities, Washington, D.C., U.S. Government Printing Office, 1965.

D - 1 = Public Universities

D - 2 = Private Universities

D - 3 = Public Four-Year Colleges

D - 4 = Private Four-Year Colleges

D - 5 = Public Junior Colleges

D - 6 = Private Junior Colleges.

A general formula for depreciation (Dj) follows, preceded by an identification of the variable used.

D_j = depreciation factor for group j, where j = 1 to 6.

r_i = yearly rate, where i = 1 or 2.

r-1 = .02 for buildings and improvements

r-2 = .05 for equipment

(b+1) = value of buildings and improvement to land value as a percent of total plant-type and control

e = equipment value as a percent of total, by type and control

a = percent of instructional and space to total plant, by control

g = percent of general space to total plant, by control, for building equipment

u_i = value of estimated value of instructional or general space to stated value by control

$$D_j = (r_i)\ (b + 1)\ (au_i)\ (gu_i) + (r_2)\ (e)\ (au_2)\ (gu_2)$$

The following D_j values were derived by using factors from Tables II-1, II-2, and II-3. They are multiplied by the average value

for physical plant in Fiscal 1964 to calculate the yearly cost of plant per full-time equivalent student for educational use (see Table 5-5, Chapter 5).

$D_1 = .0193$ $D_4 = .0146$

$D_2 = .0151$ $D_5 = .0171$

$D_3 = .0180$ $D_6 = .0144$

TABLE II-1

DISTRIBUTION OF PLANT VALUE AS REPORTED IN USOE COLLEGE FACILITIES SURVEY--1965-1966

Type	Control	Buildings & Improvements	Equipment
University	Public	75.4	20.6
	Private	76.9	15.8
Four-Year	Public	80.2	14.7
	Private	78.2	13.5
Two-Year	Public	75.2	14.3
	Private	79.1	12.2

Source: U.S. Office of Higher Education General Information Survey I--Fiscal Year 1966--Unpublished Data.

TABLE II-2

PERCENT INVESTMENT IN BUILDINGS AND EQUIPMENT BY PUBLIC AND PRIVATE INSTITUTIONS IN THE NORTHEAST UNITED STATES FOR INSTRUCTIONAL AND GENERAL USE--FISCAL 1957

Control & Category	Instructional Use	General Use
Public-Buildings[a]	53.2	7.6
Private-Buildings[a]	45.6	6.9
Public-Equipment	61.2	5.6
Private-Equipment	49.3	5.3

[a]Improvements will be considered to be in the same proportion as buildings are to their total value.

Source: U.S. Department of Health, Education, and Welfare, Office of Education, Inventory of College and University Physical Facilities, Washington, D.C., 1965, p. 58.

TABLE II-3

PERCENT PLANT INVESTMENT ESTIMATED VALUE IS TO STATED VALUE FOR PUBLIC AND PRIVATE INSTITUTIONS IN THE NORTHEAST UNITED STATES--FISCAL 1957[1]

Control	Instructional Space	General Space
Public	145.5	137.7
Private	151.7	144.0

[1]This last table is necessary in order that the yearly cost reflect replacement value, not original purchase price.

Source: Same as Table II-2 above.

TABLE II-4

FACTORS USED TO ESTIMATE YEARLY INTEREST COST ON COLLEGE PLANT BY TYPE AND CONTROL OF INSTITUTION 1963-4

	Public			Private		
	Liab/ P.V.[a]	Mun. Bond Rate[b]	I[c]	Liab/ P.V.[a]	FHA Rate[d]	I[c]
Universities	.136	.0322	.00438	.198	.0545	.01079
Four Year	.171	.0322	.00551	.219	.0545	.01194
Two Year	.191	.0322	.00615	.244	.0545	.01330

[a]Percent of Plant Value encumbered by loans for the nation, 1963-4.

[b]Muncipal Bond Rate 1964--Assumed to equal cost of money in public sector.

[c]Liabilities to Plant Value times interest cost. Factor to be applied to plant value.

[d]Federal Housing Authority Rate--Assumed to equal cost of money in private sector.

Source: (a) U.S. Department of Health, Education, and Welfare, U.S. Office of Education, Higher Education Finances, U.S. Government Printing Office, Washington, D.C., 1968.

(b) FHS and Municipal Rates from special table prepared for the House Committee on Education and Labor.

Interest Costs

The yearly costs of funds borrowed for plant will be calculated using two rates of interest: the municipal bond rate for the public sector and the Federal Housing Authority rate for the private sector.

as a guide, would amount to $350 per year per student compared with the current cost of $222 per year, an increase of $128 per student. Therefore, subsidizing students to enable them to attend private institutions, which offer substantially the same level of resources, would save the state $34 per student, or a total of $1.36 million.

There is another advantage to subsidizing or contracting with private institutions to absorb the excess demand in the public sector--flexibility. That is, there is a strong indication that the rate of increase in college attendance is leveling off. If this situation should continue, then expansion of the public sector may well result in excess space in both the public and private sectors. In addition, the state of our national economy is also a consideration. With the current high rate of interest, it is more economical to postpone further expansion of public institutions.

All of these suggestions are considered short run solutions to the expansion of public institutions of higher education. Yet they needn't be short lived. A combination of adequate student aid and public higher education may be the most economically, academically, and socially desirable method of providing higher education for the residents of any state. The present analysis would be more accurate on a state-by-state basis; however, the evidence is sufficient to indicate that state planning officers would do well to consider the possibility of utilizing institutions in the private sector, perhaps on a permanent contractual arrangement, to absorb a portion of the

influx in the public sector. It should be clear that there are alternatives to the present situation.

The Federal Government

It was discovered in a recent statement on the objectives of federal support to higher education, by the Department of Health, Education, and Welfare,[1] that three of the six stated objectives have a direct bearing on the findings on institutional selectivity and resource allocations for educational operations. It stated that any federal plan for aid to higher education should contribute first to increasing equality of opportunity for higher education regardless of income, race, or place of residence and, second, to improving the quality of higher education. The second objective could be implemented, it stated, in part by increasing the resources available to institutions. A third objective suggests the promotion of the more efficient utilization of the available educational resources. Assuming these objectives to be valid goals, then it is quite clear that a redistribution and/or the addition of a substantial amount of educational resources is necessary.

When attempting to equalize a student's opportunity to attend college, it is too often assumed that all colleges offer similar

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[1]U.S. Department of Health, Education, and Welfare, Toward a Long Range Plant for Federal Support for Higher Education (Washington, D.C., U.S. Government Printing Office, 1969), p. 3.

instructional resources. However, the equalization of the college experience or environment must not be thought of as being a single act. In one instance, to equalize opportunity implies that all financial barriers for each student are overcome. This has, in part, been accomplished by the federal grant, loan, and/or work-study programs. Yet, does this actually insure equal educational opportunity? Many of the students assisted by Federal Aid programs are from the lower levels of the social-economic scale and a recent Bureau of Census study implied that most of these students attend lower selectivity level institutions. It said: "The dependent college students most likely to attend the high ranking colleges were the dependents of household heads who were well educated, who were white collar workers, and who had high income."[1]

Further, findings in this paper indicate that, in the Northeast region, most new students enrolled in public four-year and junior colleges and in the less selective private institutions. There was also a strong evidence that plant space was still available in the latter group of schools. The excess capacity exists primarily because students in these institutions, which spend less on educational operations than other private institutions, must pay a rather high rate of tuition due to the institutions' lack of wealth or revenue from other sources. Public institutions, on the other hand,

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[1]U.S. Department of Commerce, Population Characteristics, "Characteristics of Students and Their Colleges," October 1966 (Washington, D.C., U.S. Government Printing Office, May 22, 1969, Series p.20, No. 183), p. 5.

are less costly to students but spend less on educational resources. Table 6-1 summarizes these relationships in Fiscal 1967, in all but

TABLE 6-1

A RANKING OF TUITION, OPERATING SUBSIDY, AND EDUCATIONAL EXPENSES BY CLASS AND SELECTIVITY[1] 1966-67 DOLLARS

	Selectivity Factors					
	Public University and Four Year		Private University and Non Sectarian Liberal Arts		Private Religious Liberal Arts	
	High	Low	High	Low	High	Low
Tuition	-	Low	High	High	High	Med
Operating Subsidy	-	High	High	Low	Low	Low
Educational Expenses	-	Med	High	Med	Med	Low

[1]Tuition: High--Above $1200; Medium-- $800 to $1200; Low--Below $800.
Operating Subsidy: High--Above $1000; Medium--$700-$1000; Low--Below $700.
Educational Expenses: High--Above $2000; Medium--$1500-$2000 Low--Below $1500.
Selectivity Factors: High--Combines levels 1 and 2; Low--Combines levels 3 and 4.

Source: Table 3-5.

two-year institutions. Briefly, the table indicates that students in public institutions can expect to receive less in resource allocations for educational operations than their counterparts in private institutions, but on the basis of their contribution (net tuition),

can expect to receive up to twice the return in educational operating costs/FTEE. Any federal aid program should determine a desirable minimum level of educational operating costs per student, then add an adjustment of approximately 10 to 12 percent of educational operating costs per student, to cover yearly capital costs. The question then, assuming that sufficient student aid is available,[1] and that the only missing requirement is physical plant space, is: how can the Federal Government improve or enlarge the distribution of resources to higher education? Any program which distributes block or "no purpose" aid to institutions, based on student numbers alone, and without the consideration that institutions do not spend more on educational operations primarily because they cannot afford it, is inconsistent with the first two objectives stated earlier. Further, there are cost differentials between various regions of the country. Therefore, any block federal aid program to students, and to institutions, must make adjustments for these differentials. Too many past and presently proposed aid programs reward the wealthy institutions and penalize institutions with limited endowments.

The implication for the final objective, to assist institutions in utilizing resources more effectively, was partially covered in the previous two sections, but further economic and financial

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[1]U.S. Department of Health, Education, and Welfare, U.S. Office of Education, Aspirations, Enrollments and Resources (Washington, D.C., U.S. Government Printing Office, 1969), Chapter 9.

analysis of institutions, on an individual basis rather than in the aggregate, is a necessary prerequisite. To this end, the U.S. Office of Education should, as it was mandated to do, and as it does in the field of construction of educational facilities, provide a consulting service for institutions. Through an Office of Higher Education Management Services, financial management and placement services could be provided to enable institutions to maximize use of their resources. The need for such a service is clear, considering the success of private management consulting firms and, to a lesser degree, private professional placement services.

The Direction of Future Research

Research efforts for the future, suggested by the work in this paper, include institutional finance and government support programs. More specifically, the areas which need further research at the institution level are:

1. Verification of the findings of this study on a national basis.
2. Further detail on the measure of educational output, by type of institution.
3. Further investigation of the college cost index, on a regional and national level.
4. Further clarification of the relationship between professional staff and educational operating costs.

5. Further clarification of the relationship between physical plant and educational operating costs with an adjustment for space utilization. One area of concern is the space requirements for a residential versus a commuting student. This datum is of particular importance when considering the module and cluster college concepts.
6. Further clarification of the relationship between educational operating costs and the enrollment mix. In particular, adjustment must be made for the technical and non-technical nature of educational programs.
7. A more intensive analysis of current revenue by type and control of institution. This should take the form of a flow of funds analysis as well as a multiple regression analysis.
8. An analysis of the economic cost of alternatives to the present structure of higher education, particularly methods which strive for closer student-to-faculty relationships and individualized instruction. Are these alternatives feasible for large public institutions?
9. Finally, considering the cluster of students, faculty, and institutional wealth in higher education, as it exists now, and the inability of phycometricians to determine the degree of institutional influence on students, one of the most important areas for research is an analysis of the effect

of matching institutional and faculty wealth with the lower ability level of students and of depriving the higher ability students of these resources to some minimal degree. (Current admission policy, of many institutions, in admitting disadvantaged students may provide this information in the near future.)

Further research at the government level includes:

1. What are the minimum levels of educational resources necessary for a qualitative educational program?
2. How does the availability of educational resources on a national or state level compare with the need and the expected cost, considering the cost of an increase in the demand for educational services?
3. What role, in an economic sense, can the federal government play in assisting resource-deficient institutions to attract necessary resources and still maintain the level of quality of educational services in the resource-rich institutions?
4. What role can the federal and/or state government play in furthering the trend toward consortiums in education, particularly with respect to those resource needs common to all institutions?
5. The final and persisting questions are: how can the results of present research be communicated and, where results are applicable, how may they be implemented?

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E. EDUCATIONAL AND GENERAL EXPENDITURES, continued

(*Omit cents*)

25. Instruction and departmental research ..... $

Report "all current expenditures of the instructional departments, colleges, and schools of the institution," including "expenditures for research not separately budgeted or financed." (*Manual*, p. 72–C.) Include office expenses and equipment; laboratory expenses and equipment; and salaries of department heads, professors and other instructional staff (including student assistants), technicians, secretaries, clerks, etc.

If feasible include here—rather than in item 26 below—the expenditures for *degree-credit* courses given in *extension*. (A "degree-credit" course is one that is creditable toward a *bachelor's or higher* degree.) (Expenditures for *nondegree* courses in extension should be reported in item 26, below.) (*Manual*, pp. 72–C and 73–F.)

26. Extension and public services ..... $

Include expenditures for: all nondegree-credit courses (whether conducted through regular classes or by mail, radio, or TV); cooperative extension (in land-grant institutions); public lectures; institutes; radio and TV programs for the general public (unless part of item 30 below); etc. If feasible, include in item 25, rather than here, expenditures for all *degree-credit* courses, even when such courses are offered under an extension department. (*Manual*, pp. 72–C, 73–F.) *Do not include* expenditures for instruction or services abroad.

27. Libraries. Include total expenditures (for salaries, wages, other operating expenses, books, periodicals, binding, etc.) for separately organized libraries, both general and departmental. (*Manual*, p. 73–G.) ..... $

28. Operation and maintenance of the physical plant. Include salaries, wages, supplies, other expenses, and equipment for operation and maintenance of the institutional plant. Expenditures appropriately chargeable directly to Auxiliary Enterprises (items 33–34) or to Organized Activities Relating to Educational Departments (item 30) should *not* be reported here, but should be included with the expenditures of the appropriate activity. (*Manual*, p. 73–H.) ..... $

29. Organized research (separately budgeted or financed—as distinguished from "Departmental Research." of item 25 above). Support for Organized Research may come from outside contracts or grants or from the institution's regular funds. Include expenditures for organized research and development conducted either on the campus, at agricultural experiment station(s), in hospitals, or at Federal contract and other off-campus research centers. Include *all* Organized Research, both "unclassified" (nonsecurity) and "classified."

This item is intended to provide data on total *direct* organized research expenditures during the fiscal year, and the amount expended on behalf of the Federal Government and the particular Federal Agencies specified. The *allowable indirect* costs are also requested so that the total organized research support for the specified Federal Agencies may be determined. This is *not* an attempt to determine *total* indirect costs incurred for organized research.

Enter in items *a*(1)–*a*(10), column 1 below, the direct expenditures made during the fiscal year for research under Federal Government and other contracts or grants. Reimbursement from the Federal Agencies may or may not have been received during the fiscal year. Enter in column 2, the allowable indirect costs (collected or anticipated) applicable to the direct expenditures reported in column 1. Enter in item *b*, all other direct expenditures for organized research, including funds from both outside and institutional sources.

	Direct Expenditures (1)	*Allowable Indirect Costs* (2)	*Total* (3)
a. Expenditures for research under Federal Government contract or grants:			
(1) U.S. Office of Education	$	$	$
(2) U.S. Public Health Service (include National Institutes of Health)			
(3) Other agencies in Department of Health, Education, and Welfare (Food and Drug Administration, Vocational Rehabilitation Administration, Children's Bureau, and other)			
(4) TOTAL, Department of Health, Education, and Welfare (sum of lines 1–3)			
(5) Atomic Energy Commission			
(6) Department of Defense (include Army, Navy, Air Force)			
(7) National Aeronautics and Space Agency			
(8) National Science Foundation			
(9) All other Federal Agencies			
(10) TOTAL for the Federal Government (sum of lines 4–9)			
b. Expenditures for research supported by other funds:			
(1) Private contracts or grants			
(2) State and local government contracts or grants (direct expenditures only)		x x x x x	x x x x x x x
(3) Other (direct expenditures only)		x x x x x	x x x x x x x
(4) TOTAL		x x x x x	x x x x x x x
c. Total organized research direct expenditures (sum of *a*(10) and *b*(4))		x x x x x	x x x x x x x

30. Organized activities relating to educational departments (*corresponding to activities in item 11*). Include all expenditures for administration and for operation and maintenance of the physical plant which are appropriately chargeable to Organized Activities Relating to Educational Departments.

a. Agricultural ..... $

b. Medical ..... $

c. All other ..... $

d. TOTAL (sum of items *a*–*c*) ..... $

31. (*For land-grant colleges and universities only*) **Expenditures directly related to Sales and Services of Educational Departments** (*corresponding to item 12*) ..... $

32. TOTAL EDUCATIONAL AND GENERAL EXPENDITURES (sum of items 24–31) ..... $

F. AUXILIARY ENTERPRISES.

Report GROSS expenditures, including all expenditures for administration and for operation and maintenance of the physical plant which are appropriately chargeable to Auxiliary Enterprises.

33a. Cafeterias and dining halls ..... $

33b. Student residence halls (excluding amounts reported in 33*a*) ..... $

34. Other auxiliary enterprises (corresponding to item 16) ..... $

35. TOTAL CURRENT-FUND EXPENDITURES FOR AUXILIARY ENTERPRISES (items 33–34) .. $

G. STUDENT-AID EXPENDITURES FOR SCHOLARSHIPS, FELLOWSHIPS, AND PRIZES ..... $

Include all payments for scholarships, fellowships, and prizes, whether income used for such payments came from unrestricted or from specifically designated (i.e., "restricted") funds. *Include remission of fees.* Payments to students rendering services (e.g., library assistants, teaching fellows, etc.) should be reported under specific items 24–34, and *not* here in G.

H. TOTAL CURRENT-FUND EXPENDITURES (sum of items 32, 35, and G). (If widely different from total current-fund income in item D on page 2, please explain.) ..... $

Turn to PAGE 4

PAGE 4

SUPPLEMENTAL DATA ON EXPENDITURES

(If exact data cannot readily be assembled, *approximations* or *reasonable estimates* will suffice. Please mark approximations with asterisk.)

I. INSTITUTIONAL PAYROLL AND STAFF BENEFITS. Report (*a*) payroll expenditures during the fiscal year and (*b*) value of staff benefits. Under **payroll** (items 36–38*a* below), report *gross* salaries and wages, before deductions for taxes, employees' contributions to retirement system, etc. *Do not include* the value of nonsalaried or contributed services, the value of scholarships or fellowships, nor the value of staff benefits. Under **staff benefits** (item 39), include the *institution's* payments toward retirement allowances, social security taxes, group insurance, workmen's compensation, etc.; and also the estimated value of such perquisites as a residence, services of a chauffeur, etc.

36a. Payroll expenditures for staff for "Instruction and Departmental Research." (This is the personal-service component of item 25.) Include department heads, professors, instructors, teaching assistants, etc.; and also secretarial and clerical staff of instructional departments:

(1) For professional staff (professional staff includes all persons serving at a level of work normally requiring a baccalaureate or higher degree.) ..... $_____

(2) For nonprofessional staff ..... $_____

(3) TOTAL ..... $_____

36b. Payroll expenditures for staff for "Organized Research." (This is the personal-service component of item 29.) ..... $_____

37. Payroll expenditures for total staff of "Auxiliary Enterprises" (part of item 35, p. 3) ..... $_____

38. Payroll expenditures for *all other* staff of institution—both academic and nonacademic. (Personal-service component of items 24, 26, 27, 28, 30, and 31.) ..... $_____

38a. Total payroll expenditures for entire institution (sum of items 36*a*, 36*b*, 37, and 38 above) ..... $_____

39. Total value of staff benefits (*not payroll*), as defined above ..... $_____

J. CURRENT-FUND EXPENDITURES FOR PLANT AND EQUIPMENT:

40. Expenditures from **current funds** (*included in item H*) for **equipment**—i.e., for laboratory and office equipment and machinery, furniture and furnishings, library books, trucks, farm implements, non-laboratory livestock, etc ..... $_____

41. Expenditures from **current funds** (*included in item H*) for **plant expansion and improvement** (plant additions, fixed equipment, and major alterations) ..... $_____

42. Total expenditures for plant and equipment from current funds (item 40 plus item 41) ..... $_____

K. (Information to be supplied by LAND-GRANT INSTITUTIONS ONLY)
Summary of expenditures for INTEREST:

43. Interest paid from current funds (as distinguished from plant or endowment funds):
a. On loans for Educational and General Purposes (item **E**, page 3) ..... $_____
b. On loans for Auxiliary Enterprises (item **F**, page 3) ..... $_____

44. Interest paid on mortgages on real property held as part of endowment fund ..... $_____

45. Interest paid from plant funds ..... $_____

46. Sum of items 43–45 above ..... $_____

SCHEDULE III.—PLANT FUNDS

This Schedule is divided into two parts. The first part deals with transactions of **UNEXPENDED PLANT FUNDS** and **FUNDS FOR RETIREMENT OF INDEBTEDNESS**; the second part, with the amount **INVESTED IN PLANT.**

[**UNEXPENDED PLANT FUNDS** are funds designated for investment in plant—i.e., for the purchase of land, for construction or acquisition of buildings and additions thereto, for permanent improvements other than buildings, for acquisition of equipment, and for major renewals, replacements, or repairs. **FUNDS FOR RETIREMENT OF INDEBTEDNESS** are funds designated for service of debt arising in connection with the foregoing expenditures. Both these funds are characterized by liquidity of their assets, which consist of "cash, investments, and balances available in public appropriations not yet received or drawn against by the institution." (*Manual*, pp. 43, 97–98, 104–105.)]

L. BALANCE at beginning of fiscal year in Unexpended Plant Funds and Funds for Retirement of Indebtedness. $_____

M. ADDITIONS during the fiscal year to Unexpended Plant Funds and Funds for Retirement of Indebtedness:

47. **Income from—**
a. Federal Government:
(1) U.S. Office of Education ..... $_____
(2) U.S. Public Health Service (include National Institutes of Health) ..... $_____
(3) Other agencies in Department of Health, Education, and Welfare (Food and Drug Administration, Vocational Rehabilitation Administration, Children's Bureau, and other) ..... $_____
(4) TOTAL, Department of Health, Education, and Welfare (Sum of lines 1–3) ..... $_____
(5) Atomic Energy Commission ..... $_____
(6) Department of Defense (include Army, Navy, Air Force) ..... $_____
(7) National Aeronautics and Space Agency ..... $_____
(8) National Science Foundation ..... $_____
(9) All other Federal Agencies ..... $_____
(10) TOTAL from Federal Government (sum of lines 4–9) ..... $_____
b. State government ..... $_____
c. Local government (county, city, district) ..... $_____
d. Student fees restricted to use for plant expansion or debt retirement ..... $_____
e. Private gifts and grants from—
(1) Alumni (individually, or through alumni associations) ..... $_____
(2) Churches (denominations, congregations, orders) ..... $_____
(3) Corporations, business concerns ..... $_____
(4) Foundations ..... $_____
(5) Individuals, nonalumni ..... $_____
(6) Other sources ..... $_____
(7) TOTAL PRIVATE GIFTS AND GRANTS (sum of items 1–6 above) ..... $_____
(*a*) Of the total private gifts and grants above, what amount was received through *bequests* (willed)? ..... $_____
f. Earnings on plant-fund investments and proceeds from sale of plant-fund assets ..... $_____
g. Other income (*do not include* transfers or loans) ..... $_____
h. TOTAL INCOME (sum of items *a*–*g* above) ..... $_____

48. **Transfers (not loans)** to Unexpended Plant Funds or Funds for Retirement of Indebtedness:
a. From current funds ..... $_____
b. From other funds ..... $_____
c. TOTAL TRANSFERS (sum of *a* and *b*) ..... $_____

Go on to PAGE 5

49. **Loans** to Unexpended Plant Funds or Funds for Retirement of Indebtedness from—
   a. Federal Government ..... $
   b. Other noninstitutional sources ..... $
   c. Institutional funds (endowment funds, funds functioning as endowment, current funds, etc.) ..... $
   d. TOTAL LOANS (sum of items *a–c*, above) ..... $

50. **Total additions** during the fiscal year to Unexpended Plant Funds and Funds for Retirement of Indebtedness (sum of items 47*h*, 48*c*, and 49*d*) ..... $

N. TOTAL OF FUNDS AVAILABLE DURING THE FISCAL YEAR (Initial Balance, item L, plus **Total Additions**, item 50) ..... $

O. DEDUCTIONS during the fiscal year from Unexpended Plant Funds and from Funds for the Retirement of Indebtedness. (Include only *actual deductions or disbursements. Do not include* purchases on open account until payment is made.)

51. **Disbursements from plant funds for additions to plant assets.** (Include disbursements for renewals, replacements, and major repairs; and for building materials, as well as for finished construction.)
   a. Land ..... $
   b. Buildings (including fixed equipment) ..... $
   c. Improvements other than buildings (utility lines, landscaping, etc.) ..... $
   d. Equipment (not reported in *b* above). Include library books, furniture, furnishings, laboratory and office equipment and machinery, trucks, farm implements, nonlaboratory livestock, etc ..... $
   e. TOTAL PLANT ADDITIONS, REPLACEMENTS, ETC., from plant funds (sum of items *a–d* above) ..... $

   The following two queries are made in recognition of the fact that some institutions expend current funds for equipment and other plant assets, but later *transfer* such current-fund expenditures to the plant-fund section of their accounts (*Manual*, pp. 74–75):
   (1) Of the current-fund expenditures for *equipment* (item 40), how much (if any) was transferred to the plant-fund section and *is included in item* 51*e*? ..... $
   (2) Of the current-fund expenditures for *plant expansion and improvement* (item 41), how much (if any) was transferred to the plant-fund section and *is included in item* 51*e*? ..... $

52. **Reduction of capital indebtedness:**
   a. Repayment or reduction of the principal of bank loans, notes, mortgages, bond issues, etc. (corresponding to items 49*a* and 49*b* above). Include premium on bonds called ..... $
   b. Repayment of interfund loans (corresponding to item 49*c* above) ..... $
   c. TOTAL REDUCTION OF CAPITAL INDEBTEDNESS (sum of *a* and *b*) ... $

53. **Other deductions** from Unexpended Plant Funds or Funds for Reduction of Indebtedness. (Include interest on plant indebtedness, paid from plant funds; transfers and loans from plant funds to other institutional funds; and other deductions.) ... $

54. **Total deductions during the fiscal year** (sum of items 51*e*, 52*c*, and 53) .....

P. BALANCE at end of fiscal year in Unexpended Plant Funds and Funds for Retirement of Indebtedness (item **N** at bottom of preceding page, less item 54.) ..... $

[INVESTED IN PLANT.—The purpose of this section is to obtain (*a*) the net amount added to value of plant during the fiscal year, (*b*) the book value of plant at the end of the fiscal year, and (*c*) the net investment in plant (book value of plant less liabilities of plant funds).]

Q. BOOK VALUE OF PLANT at beginning of fiscal year[1] ..... $

R. ADDITIONS TO PLANT VALUE during the fiscal year:
55. By expenditures from plant funds (item 51*e*) ..... $
56. By expenditures directly from current funds (item 42 less items 51*e*(1) and 51*e*(2)). Item 55 above includes expenditures transferred from current funds to plant funds ..... $
57. Gifts and grants of *plant assets* (real property). (Distinguish from cash gifts, such as in 47*e*.) Report at appraised value ..... $
58. Increase in value due to reappraisal or other adjustments ..... $
59. TOTAL ADDITIONS TO PLANT VALUE (sum of items 55–58 above) ..... $

S. DEDUCTIONS FROM PLANT VALUE during the fiscal year:
60. Plant assets written off or disposed of (including equipment[2]) ..... $
61. Decrease in value due to reappraisal or other adjustments[3] ..... $
62. TOTAL DEDUCTIONS (sum of items 60 and 61) ..... $

T. NET ADDITIONS TO PLANT VALUE during the fiscal year (item 59 less item 62) ..... $

U. BOOK VALUE OF PLANT at close of fiscal year[1] (item **Q** plus item **T**) ..... $

Consisting of:
63. Land ..... $
64. Buildings (including fixed equipment) ..... $
65. Improvements other than buildings ..... $
66. Equipment (defined in item 51*d* above) ..... $
67. TOTAL BOOK VALUE (sum of items 63–66. *This sum should equal the figure for item* **U**. In event of discrepancy, please explain) ..... $

Liabilities of plant funds at close of fiscal year:
68*a*. Mortgage principal outstanding ..... $
68*b*. Bonds outstanding ..... $
68*c*. Bank loans outstanding (excluding amounts reported in 68*a* and 68*b*) ..... $
69. Accounts payable, notes payable (other than to banks), accrued interest, etc ..... $
70*a*. Loans repayable to other institutional funds (endowment, funds functioning as endowment, current funds, etc.) ..... $
70*b*. Endowment funds invested in plant ..... $
71*a*. TOTAL LIABILITIES (sum of items above) ..... $
71*b*. Less liabilities of unexpended plant funds (borrowed but not expended as of close of fiscal year) .... $
71*c*. Liabilities against investment in plant (item 71*a* less item 71*b*) ..... $

V. NET INVESTMENT IN PLANT at close of fiscal year (item 67 less item 71*c*) ..... $

---

[1] Report value of physical assets preferably at cost (or appraised value at time of acquisition, if a gift), except that library books may be valued either at cost or at "one dollar per volume or other reduced arbitrary value." (*Manual*, pp. 44, 98.) The book value of service property (such as a powerplant) and of property used for auxiliary enterprises may reflect an allowance for depreciation, if replacement costs are to be met from reserve funds established for this purpose out of income. (*Manual*, pp. 143–151.)

[2] For definition of "equipment," see item 51*d*.

[3] See concluding sentence of footnote 1 above, regarding depreciation.

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SCHEDULE IV.—ENDOWMENT, STUDENT LOAN, AND ANNUITY AND LIVING TRUST FUNDS

NOTE A.—Items 73 and 74 deal only with additions or deductions to the PRINCIPAL of funds. Except as mentioned in Note B, income from endowment should not be reported in this Schedule, unless the income is added to principal. Report endowment income in item 9 (Educational and general funds) or in other funds from which the income is to be expended.

NOTE B.—Count loan funds as part of endowment (column b) when only the *income* of such funds is loanable. The interest or net earnings on such restricted endowment is creditable to loan funds (item 73d).

NOTE C.—Do not include in Student Loan Funds (column c, items 72–75) the National Defense Student Loan funds. Exclude both the government and the institution's contributions to the NDSL funds. Do include National Defense Student Loan fund data in items 76 and 77 as appropriate.

NOTE D.—"Annuity and living trust funds" (column d) include funds acquired by the institution subject to *annuity agreements or living trust agreements.* Such agreements usually require the institution to pay a stipulated sum, or the amount earned, to a designated beneficiary during the life of that individual. Not to be confused with pension or retirement funds.

Item (a)	Endowment and funds functioning as endowment [1] (b)	Student loan funds [2] (omit NDSL funds) (c)	Annuity and living trust funds (Not pension or retirement funds) (d)
	(Omit cents)	(Omit cents)	(Omit cents)
72. PRINCIPAL OR BALANCE at beginning of fiscal year	[3] $	[3] $	$
73. Additions to PRINCIPAL during the fiscal year (exclude amounts reported as current-fund income (Schedule I) or as additions to plant funds) (Schedule III):			
a. Private gifts and grants from [4]—			
(1) Alumni (individually, or through alumni association)			
(2) Churches (denominations, congregations, orders)			
(3) Corporations, business concerns			
(4) Foundations			
(5) Individuals, nonalumni			
(6) Other sources			
(7) TOTAL private gifts and grants (sum of above items)			
(*a*) Of the total private gifts and grants above, what amount was received through bequests (willed)? (Do not add in item 73*i*).	(.....)	(.....)	(.....)
b. Public appropriations, added to principal	x x x x x x x		x x x x x x x
c. Net realized gains on investments,[5] added to principal (if a net loss, report in item 74*a*)			
d. Interest or net earnings on investments,[6] *if added to principal.* (See footnote 6)		[6]	
e. Interest on student loans	x x x x x x x		x x x x x x x
f. Student fees specifically designated for loan funds	x x x x x x x		x x x x x x x
g. *Transfers* from other funds (do not include interfund or other *loans*)			
h. All other additions to PRINCIPAL (exclusive of interfund loans)			
i. TOTAL ADDITIONS TO PRINCIPAL during the fiscal year (sum of items above)			
74. DEDUCTIONS FROM PRINCIPAL during the fiscal year:			
a. All deductions, exclusive of interfund transfers or loans	[7]	[8]	[9]
b. Transfers to other funds (do not include interfund loans)			
c. TOTAL DEDUCTIONS (sum of *a* and *b*)			
75. PRINCIPAL OR BALANCE at end of fiscal year [10] (sum of items 72 and 73*i* less item 74*c*)	[3]	[3]	

76. National Defense Student Loan Funds:

a. Federal capital contributions received during fiscal year ..... $.....

b. Principal of fund at end of fiscal year. Include loans outstanding at end of fiscal year ..... $.....

77. Student loan funds:

	NDSL	*Other*
a. Amount loaned during fiscal year	$.....	$.....
b. Amount repaid during fiscal year	$.....	$.....
c. Loans outstanding at end of fiscal year	$.....	$.....
d. Unloaned funds at end of fiscal year	$.....	$.....

[1] Include in endowment the book value of all assets of the endowment funds and funds functioning as endowment. *Include* land, securities, and other assets of the endowment which are held in trust (by the State or by a private agency) for the benefit of the institution. *Do not include* funds held in trust by your institution for another institution. *Include* loans repayable to endowment funds from plant funds or other funds. *Include* funded reserves for losses on endowment principal, for stabilization of endowment income, and for amortization of bond premium; also funded reserves for depreciation and major repairs of real property held as part of endowment fund. LAND-GRANT INSTITUTIONS should include the existing principal of the Federal land grant(s).

[2] All funds available for loans to students other than National Defense Student Loan Funds. Do not include loan funds exclusively for faculty or staff.

[3] Report *loans outstanding* less allowance for doubtful loans, plus *unloaned funds* (both invested and uninvested). (If a funded reserve for loss on loans is maintained, do not make allowance for doubtful accounts.) (Do not include National Defense Student Loan Funds.)

[4] Do *not* include in column (*c*) student loans repaid during the year; report these in item 77*b*.

[5] Include real property held as part of the endowment fund. Do not, however, include real property held in *plant fund* (Schedule III), even if such property represents a loan from endowment funds to plant funds. Earnings of plant funds and realized gains or losses on plant-fund assets should be recorded in Schedule III.

[6] Include here the interest or net earnings on the principal of loan funds which is classified as endowment. See "Note B" at head of page.

[7] Net realized losses on investments, decrease in reserve for losses, depreciation of real property uncompensated by an increase in funded reserve for depreciation, etc.

[8] Students' notes written off (repaid loans are reported in item 77*b*), net realized loss on investments, expenses of administration, etc.

[9] Include annuities paid.

[10] Exclusive of loans (if any) repayable to other funds, to bank, etc.

Information supplied by ..... (Name) ..... (Title) ..... (Phone No.) ..... (Date)

PLEASE CHECK to make sure you have supplied information requested on first page regarding BRANCH INSTITUTIONS.

U.S. GOVERNMENT PRINTING OFFICE: 1964—O-740-606

OE-2019 (' 63)
(FORMERLY OE-DSR-301)

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION
WASHINGTON, D.C. 20202

BUDGET BUREAU NO. 51-R224.8
APPROVAL EXPIRES: 3-15-64

FACULTY AND OTHER PROFESSIONAL STAFF: FALL TERM 1963-64

The President

☐ Check here if your institution has no branch.

This report includes branches as follows:

This report excludes branches as follows:

TO THE PRESIDENT:

This regular biennial report provides basic data on faculty and other professional staff in higher education. Summary data, analytic information, and data for individual institutions will be provided to you and others interested in higher education. The definitions and classifications are essentially the same as were used in the 1961-62 report.

Comparability of data among institutions and accuracy and value of the published data can be greatly enhanced by careful observation of the general and detailed instructions. Please review also for consistency with previous reports. Check to insure that details add to totals. Where an exact count is not readily available, please provide estimates.

The significance of these data and the need for them are evident. Your prompt cooperation in completing and returning the questionnaire will be appreciated.

VIRGIL R. WALKER, Acting Director
Division of Educational Statistics

GENERAL INSTRUCTIONS

SCHEDULE I provides for a count of faculty and other professional staff as of the fall term (quarter, semester, trimester, or equivalent) of the 1963-64 academic year. In this report the term "faculty" includes all instructional staff members - both those with full academic status or tenure and those without. The term "professional staff" includes all persons serving at a professional level (i.e., work normally requiring a baccalaureate or higher degree) whether in administration, student personnel services, research, library, auxiliary enterprises, etc.

If a staff member is occupied in more than one official capacity, he should be counted in all the positions in which he serves. (A classification of the various types of positions into administration, student personnel services, resident instruction in degree-credit courses, etc., is given in SCHEDULE 1.) Examples: (a) A person who serves both as dean of the faculty and as a part-time professor of biochemistry should be counted once for "general administration" and again for "resident instruction in degree-credit courses," "teaching part time" (Items 1 and 3a(2), respectively, in SCHEDULE 1). (b) A faculty member who is engaged both in giving resident degree credit instruction and in giving courses in extension would be counted once under "faculty for resident instruction in degree credit courses" (part-time, Item 3) and again under "extension staff" (Item 6).

INCLUDE: (1) Full-time and part-time salaried faculty and other professional staff; (2) faculty and other professional staff rendering established services without cash remuneration ("contributed services," occuring most commonly in church-related institutions); and (3) staff members on sabbatical leave (in the same positions they would occupy if on regular duty).

DO NOT INCLUDE: (1) Clerical or other nonprofessional personnel, (2) those on leave without pay, (3) staff in emeritus or retired status, (4) positions at any branch campus or extension center in a foreign country, or (5) cooperating teachers. If a particular section of the report is not applicable to your institution, please write "none" in that section.

SCHEDULE II provides for a count of the instructional staff in the main summer session of 1963.

FACULTY AND OTHER PROFESSIONAL STAFF: FALL TERM 1963-64

1. Please read the "General Instructions" on the cover page and the "Detailed Instructions" pertaining to individual line items on the opposite page before completing this form.
2. If exact data are not available, please report estimates. Mark estimates with an asterisk. Write "none" for items NOT applicable to your institution.
3. Count each person in all the positions in which he serves in items 1-10. Count persons in items 11 and 12.

SCHEDULE I - FACULTY AND OTHER PROFESSIONAL STAFF (QUARTER, SEMESTER, TRIMESTER, OR EQUIVALENT) 1963-64

	ITEM	Men	Women	Total
1	Professional Staff for General Administration	20,559	4,954	25,513
2	Professional Staff for Student Personnel Services	11,741	8,993	20,734
3	Faculty for Resident Instruction and Related Duties in Degree-Credit Courses			
	a Faculty with the rank of Instructor or equivalent or above teaching and/or performing Departmental Research and Related Instructional Duties *(Sum of items 3a(1) and 3a(2) below.)*	245,539	59,920	305,459
	(1) Full-time instruction and related departmental duties	162,847	41,714	204,561
	(2) Part-time instruction and related departmental duties	82,692	18,206	100,898
	(3) Full-time equivalent of part-time positions *(Must be less than 3a(2) above)*	26,289	6,523	32,806
	b Junior Instructional Staff below rank of Instructor or equivalent	42,272	10,422	52,694
4	Faculty for Resident Instruction in Non-Degree Credit-Courses *(See Instructions)*	11,554	3,561	15,115
5	Instructional Staff for Courses by Mail, Radio or TV, Short Courses, and Individual Lessons	7,007	2,235	9,242
6	Extension Staff			
	a Giving courses (holding classes). *(Include both degree-credit and non-degree-credit courses in extension.)*	17,558	3,731	21,289
	b *(Land-grant institutions only)* Agriculture and home economics extension staff operating at or from land grant colleges	3,189	894	4,083
	c *(Land-grant institutions only)* District and county extension agents for agriculture home demonstration, and 4-H Clubs	7,017	4,313	11,330
	d Other professional staff in extension service. *(Indicate nature of duties.)*	871	195	1,066
7	Professional Library Staff	4,095	8,444	12,539
8	Professional Staff for Organized Research *(Usually separately budgeted)*			
	a Professional Staff for Organized Research *(Sum of items 8b and 8c)*	55,571	9,517	65,088
	b Full-time on organized research	26,617	5,412	32,029
	c Part-time on organized research	28,954	4,105	33,059
	d *(Land-grant institutions only)* Professional research staff of agricultural experiment stations (included in items 8a, 8b, and 8c above)	9,575	751	10,326
9	Instructional Staff in Elementary or Secondary Schools Operated by your Institution			
	a Instructional Staff in Elementary or Secondary Schools *(Sum of items 9b and 9c)*	3,286	4,216	7,502
	b Elementary schools *(including nursery and kindergarten)*	727	2,756	3,483
	c Secondary schools. *(Include secondary grades of a school operated as a unified combination of high school and college.)*	2,559	1,460	4,019
10	Other Professional Positions. *(Please specify duties.)*	4,030	1,220	5,250
11	Number of Different Persons Reported in Items 1-10			
	a Total number of Different Persons (each person counted once and only once) *(Sum of items 11b and 11c)*	387,765	110,594	498,359
	b Number of persons serving full-time	248,781	77,426	326,207
	c Number of persons serving part-time	138,984	33,168	172,152

SCHEDULE II - INSTRUCTIONAL STAFF FOR DEGREE-CREDIT COURSES IN SUMMER SESSION OF 1963

	ITEM	Men	Women	Total
12	Number of persons on instructional staff for degree-credit courses in main summer session of 1963	73,851	20,764	94,615

INFORMATION SUPPLIED BY	NAME AND TITLE	DATE

DETAILED INSTRUCTIONS FOR PREPARING SPECIFIC ITEMS UNDER SCHEDULES I AND II

SCHEDULE I - Faculty and Other Professional Staff Fall Term 1963-64

ITEM 1 - PROFESSIONAL STAFF FOR GENERAL ADMINISTRATION - Include all professional staff, e.g., president, provost, chancellor, vice president, assistant to the president, dean of administration, dean of academic affairs, dean of summer session, director of public relations, comptroller, registrar, admissions officer, business manager, director of athletics (if considered general administration), chief accountant, college attorney, etc. - i.e., all whose administrative functions extend across departmental or divisional lines. Normally editors, heads of publications divisions, university press and alumni publications, and superintendents of buildings and grounds appear here. EXCLUDE all other custodial staff. EXCLUDE the head of an instructional unit, such as the head of the English Department, the Dean of the School of Education, the Dean of the Law School, etc. Such persons not engaged primarily in general administration should be counted under "FACULTY FOR RESIDENT INSTRUCTION. . ." Professional library staff positions are to be reported in Item 7. EXCLUDE clerical or non-professional staff in the Office of the President, the Office of the Business Manager, the Infirmary, or elsewhere. EXCLUDE professional staff for student personnel services; they should be reported in Item 2.

ITEM 2 - PROFESSIONAL STAFF FOR STUDENT PERSONNEL SERVICES - Include all student personnel deans (e.g., dean of students, director of student affairs, etc.), university physicians and registered nurses, dietitians, chaplains, psychologists, psychometrists, and all professional staff for student counseling, placement services, student loan services, student housing services, religious life, student activities, etc. Funds for such staff are often separately budgeted. EXCLUDE professors, department heads, or others engaged primarily in instruction, research, or departmental administration with only incidental participation in student personnel work.

ITEM 3 - FACULTY FOR RESIDENT INSTRUCTION AND RELATED DUTIES IN DEGREE-CREDIT COURSES - Report in items 3a and 3b all faculty for resident instruction in degree-credit courses, including faculty for evening and Saturday degree-credit courses, unless such courses are classified as extension. A degree-credit course is one that normally carries credit toward a baccalaureate or higher degree or equivalent recognition either in your own institution or by transfer to another institution. Report coaches, clinicians, and military if they fit this category. Report coaches also in Item 10. DO NOT INCLUDE persons whose functions are restricted solely to courses by mail, radio, or TV, to short courses, to individual lessons (such as music, art, speech, etc.), or to extension courses. Report such persons in Items 5 or 6.

3a. FACULTY WITH THE RANK OF INSTRUCTOR OR EQUIVALENT OR ABOVE TEACHING &/OR PERFORMING DEPARTMENTAL RESEARCH AND RELATED INSTRUCTIONAL DUTIES - Include department heads and deans of instructional divisions such as Dean of School of Education, Dean of Engineering, etc. Include also consultants with rank who serve on a continuing basis. Include lecturers if their equivalent rank is that of instructor or above. Include all persons who teach resident degree-credit courses if they hold the rank of instructor or above, even though they occupy other professional positions and are reported on other lines of the report. In institutions providing training for elementary or secondary school teaching, include supervisory, demonstration, or "critic" teachers who are paid wholly or principally by your institution. Such persons should be counted in Items 9b or 9c. Item 3a is the sum of items 3a(1) and 3a(2) below.

3a(1). FULL-TIME INSTRUCTION AND RELATED DEPARTMENTAL DUTIES - Include as full-time faculty those department heads and deans of instructional divisions whose services, with or without teaching, are on a full-time basis. Include ROTC faculty except for those specified in Item 3b. Departmental research staff are included here.

3a(2). PART-TIME INSTRUCTION AND RELATED DEPARTMENTAL DUTIES - See Item 3a(1) above. Include departmental research and instructional staff who teach part-time.

3a(3). FULL-TIME EQUIVALENT OF PART-TIME POSITIONS - For those employed part-time - see Item 3a(3) - report their full-time equivalent here according to the practice of your own institution. Budget records often indicate whether the individual is supposed to devote one-fourth or one-half of a full-time load to his duties. In any event, department heads can generally supply this information regarding members of their staffs. In some cases (e.g., instructional staff in medical schools) it may be necessary to adopt an arbitrary or approximate method of arriving at full-time equivalent. Where it is not feasible to compile exact information on full-time equivalent, make an estimate rather than leave item blank. Example: If you have one person half-time and two persons one-fourth time, count them as one person here.

3b. JUNIOR INSTRUCTIONAL STAFF BELOW RANK OF INSTRUCTOR OR EQUIVALENT - Count assistant instructors, teaching fellows, teaching assistants, and laboratory assistants only if their functions include instruction of students. Include also ROTC enlisted personnel who are drill instructors or who teach courses but do not have faculty rank. EXCLUDE non-teaching assistants to the instructional staff such as clerks or student help and cooperating teachers in teacher education programs.

ITEM 4 - FACULTY FOR RESIDENT INSTRUCTION IN NON-DEGREE-CREDIT COURSES - Include resident instructional

Instructions continued on page 4

SCHEDULE I - Continued

staff for adult education and terminal-occupational education, remedial and other types of non-degree-credit courses such as remedial English, speed reading, remedial mathematics, etc. If classified by your institution as extension, report under Item 6 rather than here.

ITEM 5 - INSTRUCTIONAL STAFF FOR COURSES BY MAIL, RADIO OR TV, SHORT COURSES, AND INDIVIDUAL LESSONS - Staff teaching individual lessons in music, art, speech, etc., should be included only if such instruction is wholly or principally for students of college age or above.

ITEM 6 - EXTENSION STAFF - Self explanatory.

ITEM 7 - PROFESSIONAL LIBRARY STAFF - Include head librarian, assistant librarians, and all other professional library staff.

ITEM 8 - PROFESSIONAL STAFF FOR ORGANIZED RESEARCH - Include faculty and other professional staff engaged specifically for pure or applied organized research (part-time or full-time) and those who have been relieved from some or all other duties in order to perform systematic, organized research (usually separately budgeted). Funds might be from internal sources or external sources such as Federal funds, grants-in-aid, or miscellaneous grants. Include agricultural or engineering experiment station research personnel. EXCLUDE graduate students unless they are performing research at a professional level (i.e., work requiring a baccalaureate or higher degree), research consultants who serve on an occasional basis only, and those doing only departmental research.

ITEM 9 - INSTRUCTIONAL STAFF IN ELEMENTARY OR SECONDARY SCHOOLS OPERATED BY YOUR INSTITUTION - Include schools or educational project staff maintained or utilized by your institution to facilitate practice teaching or directed observation by students of education, psychology, social work, home economics, etc., schools preparatory for admission to the college, and schools staffed and operated by the institution as a convenience to the community. Report staff only if paid wholly or principally from funds administered by your institution.

ITEM 10 - OTHER PROFESSIONAL POSITIONS - Please specify duties. This category includes coaches, speech pathologists, band directors, curators, consultants not reported in Item 8, etc.

ITEM 11 - NUMBER OF DIFFERENT PERSONS REPORTED IN ITEMS 1-10 - Personnel whose part-time assignments to two or more positions is equivalent to full-time service should be reported in Item 11b. Those who are rendering services as faculty without cash remuneration should be reported in items 11b or 11c, as appropriate.

SCHEDULE II - Instructional Staff for Degree-Credit Courses in Summer Session of 1963

ITEM 12 - NUMBER OF PERSONS ON INSTRUCTIONAL STAFF FOR DEGREE-CREDIT COURSES IN MAIN SUMMER SESSION OF 1963 - Include department heads of instructional units, professors, associate professors, etc., as well as visiting staff who taught in the summer session, junior instructional staff, teaching fellows, and teaching assistants who teach courses. DO NOT INCLUDE administrative or library staff unless engaged in instruction. The term "degree-credit course" is defined in Item 3a.

size, assuming adequate classroom space is available. There are other methods which can be used to increase productivity, but they are in conflict with tradition. For example, productivity of faculty could be improved if students were allowed to complete all course requirements prior to the end of the normal scheduled time, and thereby be allowed to move into the second semester work immediately. At this point, there is an increase in the productivity of the faculty member. In this case, the student would be expected to pay for the number of credits completed rather than credit hours per semester. No additional space, faculty or other services would be necessary. In a sense, this program would require a good deal of independent study, but this is compatible with the desires of many students.

Implications for State Governments

Strong arguments have been made by state governments for block grant aid from the Federal Government. One advantage cited by States, arguing for this type of aid as opposed to categorical aid, is that each state has unique social and economic needs and, as such, is better able to determine how to distribute the funds. One of the significant findings in this study relates to the commonality in the relative distribution of the components of educational operating costs over various enrollment levels, for all seven institutional classes. Another finding highlighted the consistency in costs for the professional staff. They make up over 75 percent

of educational operating costs per student. Commonality was also noted in the educational expense-to-total expense ratio by control, regardless of the absolute level of funding. If expenses, on a relative basis, are "locked in" to the degree suggested, then the advantages cited for block grant aid to state governments would seem to apply also to state education institutions. It follows then that state governments should fund state institutions of higher education on a block grant basis. In making the transition, there need not be any change in the budgeting allocation process. However, after an institution's budget has been approved, there should be no restrictions on how the funds are spent although there usually are state regulations requiring that institutions provide a legal accounting of where funds have been spent. Should a public institution have funds left at the end of a fiscal year, it should be allowed to carry them over to the next fiscal year and spend them where it would be academically advantageous. This privilege would undoubtedly cut down the wasteful year-end fiscal spending so often practiced in public institutions under present systems in most states. Specifically there is concern that unspent state allocations will result in next year's budget request being decreased; in other words, there is literally a penalty for efficiency in public institutions. Perhaps this suggestion is not as refined as it could be, but it does offer flexibility in the implementation of academic policy through more efficient utilization of funds. The question of

how much a state should spend on educational operations per student remains unanswered. However, in the absence of standards, the state could do no worse than to allow funds to be spent freely, after approving the institution's budget.

Lastly, as an alternative, tuition grants to students attending private institutions may, in the short run, relieve some of the pressure for educational spaces in the public institutions, and at a lower or equal cost to the state. For example: it was suggested that additional students could be accommodated in religiously controlled liberal arts colleges. Let us assume that any additional students admitted to religiously controlled liberal arts colleges would be attending the least selective institutions (level 4). In Fiscal 1967, it is estimated that these institutions could have accommodated an additional 40,000 students.[1]

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[1]Calculated by the following formula which assumes that private institutions require 25 percent more space than their counterparts in the public sector. Plant value per student (FTEE), which is considered to be an indication of available plant space per student, forms the basis for the calculation. Implicit in this methodology is the belief that the relationship of instructional to total space is constant in both the public and private sectors. This assumption was verified in an unpublished study on College Facilities by the U.S. Office of Education in September 1968.

$$\text{Excess Plant Capacity Factor} = \left(\frac{\text{Mean Plant Value for Level 4 Religious Controlled Institutions}}{1.25 \times \text{Mean Plant Value for Level 4 Public Institutions}}\right) - 1$$

$$\text{Number of spaces available} = \text{Excess plant capacity factor} \times \text{Number of students in level 4 religiously controlled institutions.}$$

Educational operating costs per student (FTEE), in the least selective institutions of each sector, were about equal in Fiscal 1967; $1,155 and $1,166 in the public and religiously controlled institutions respectively. Since it has been established previously that educational operating expenses per student (FTEE) are highly correlated with staff and other resources, it is therefore desirable that these levels be maintained, with additional students. To maintain the same level of educational operating costs per student when additional students are admitted to the religiously controlled institutions, the students will have to pay their full educational costs since, as suggested above, institutional wealth in these schools is limited. That is, the expectation is that no part of educational operating costs for the additional students will be subsidized by the institution.

In Fiscal 1967, each additional educational space was valued at $1,388 in total educational costs per student; $1,166 for educational operating costs and $222 for yearly plant cost. It is this amount ($1,388) which the additional students would have to pay in tuition. In Fiscal 1967, the state paid $1,046 in gross operating subsidy while the student contributed $248 in net tuition, for a total cost of $1,294. The difference between the cost in each sector is $94 per student and represents an additional cost to the state. However, new plant cost, to accommodate additional students in the public sector, using Fiscal year 1967 mean plant value per student

per student (FTEE): the higher the dollar value, the greater the relative share. This is antithetical of the behavior of instructional costs which, on a relative basis, move in the opposite direction of administrative costs over increasing expenditure and enrollment levels.

6. On a one-to-one basis, without regard for the level of enrollment, instructional and administrative costs were the most strongly related of all components with educational operating costs. These associations were common over all classes.

7. On the surface, the concept of economies of scale appears to be inconsistent with the finding that institutions expand their services when funds are made available. Can the existence of economies of scale be rationalized? Initially, at levels of enrollment below 1,000 students, there is sufficient evidence to indicate that educational operating costs per student (FTEE) decrease with increases in enrollment (FTEE), in private four-year and two-year colleges. At the same time, little change is observed in the relative distribution of component costs, over enrollment levels. In effect, then, these institutions have been underutilizing plant and staff to such a degree that few additional facilities or staff are needed with the addition of students, and educational operating costs per student fall proportionately. Secondly, it has been demonstrated that the relative share of educational operating costs per student (FTEE) being used for plant operations and the library, to a lesser

degree, fall with enrollment increases, regardless of the level of operating expenses. Finally, it is implied that economies of scale can not exist with the shifting of a relative amount of operating funds, from instructional to administrative purposes, over varying enrollment levels. The fact that an institution chooses to expand its services, given available funds, does not suggest that funds are not used more effectively at selected enrollment (FTEE) levels.

Staffing and Educational Operating Expenses

1. Approximately 75 percent of all educational operating expenditures are allocated to wages for the professional staff.

2. There is a strong positive relationship in all classes between educational operating costs per student and the number and credentials of the institutions' professional staff.

3. In all classes of institutions, the student-to-faculty ratio is the dominant variable. Changes in the student-to-faculty ratio, for example, contributed more to differences in educational operating costs per student than the combination of the next two most influential staffing ratios: the number of Ph.D.s on the faculty and the student-to-administrator ratio.

4. Comparisons of ratios, among classes, was consistent with the distribution of educational operating expenses. The student-to-faculty ratio, for example, was lower in private institutions when compared with public schools, while the ratios were lower in universities, four-year institutions, and junior colleges, in that order.

5. It was difficult to determine whether a trade-off of the staffing mix occurred among classes of institutions, although within classes, this appeared to be true, on the basis of one-to-one and multiple regression analyses. (Trade-off was defined as: fewer Ph.D.s for a lower student-to-staff ratio, etc.)

The Relationship Between the Value of Physical Plant and Educational Operating Expenses

1. The value of plant and operating expenses per student were highly correlated in public institutions and those two classes of private institutions with the highest selectivity level of students, universities, and non-sectarian liberal arts colleges.

2. The ratio of plant value to educational operating expenses was relatively consistent over the 1961-62, 1963-64, and 1966-67 Fiscal Periods among all but two classes, religiously controlled liberal arts colleges and private two-year schools. In these two classes, the ratio of plant value to educational operating expenses was considerably higher, suggesting less efficient use of plant.

3. In all institutions, plant appeared to be utilized more efficiently in Fiscal 1967 compared with Fiscal 1962 as the ratio of educational operating expenses to plant value per student decreased. This was also true when institutions were analyzed by selectivity level of student.

4. In most institutions, net tuition is less than the educational operating expense per student. Therefore, each additional

student is a financial burden (educational operating subsidy per student) on the institution. Further, many institutions are unable to utilize available plant space fully because of limited institutional wealth.

5. In Fiscal 1964 looking at two classes, religiously controlled liberal arts and two-year colleges, yearly plant cost was equivalent to 19 to 25 percent of educational operating costs per student. In the other five classes, the values were about half, 9 to 13 percent. The yearly cost of plant indicates an additional subsidy to the student from the institution he attends and further exemplifies the financial needs of institutions of higher education.[1]

Selectivity Level of Student and
Instructional Resources

1. Through a mutual selection process, the better qualified students (based on the Cass and Birnbaum selectivity level of student factor) choose those institutions with the greatest resources. Resources are defined as the combination of educational operating expenditures, staff, and physical plant used for educational purposes.

2. In the more selective (high expenditure) institutions, not only are the operating subsidy and educational operating expenses

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[1]Yearly cost of plant does not include what economists call the imputed cost of plant; that is, the opportunity cost of alternative uses of physical plant resources. However, the calculation of the yearly cost of plant is acceptable in the cost accounting sense.

While the outstanding debt was not available for each institution, the liability to plant value rate was available from published U.S. Office of Education data[1] (Table II-4).

The yearly cost of interest (YCI) is determined as follows:

YCI = (Plant Value/FTEE) (Liabilities/Plant Value) (Yearly Cost of Money)

The value of the production of the last two factors is equal to I_j, where j = 1 to 6 and is equal to the type and control of the institution, and follow:

$I_1 = .00438$ $\quad$ $I_4 = .01079$

$I_2 = .00551$ $\quad$ $I_5 = .01194$

$I_3 = .00615$ $\quad$ $I_6 = .01330$

The above formula can now be restated as follows:

$$YCI_j = (PV/FTEE)_j \; I_j$$

Multiplying plant value/FTEE, by the factors I_j and D_j, then gives a crude approximation of yearly plant cost (YPC). The 1964 values, in dollars, are reported in Chapter 5, Table 5-5.

The formula is: $YPC = (PV/FTEE)_j \; I_j \; D_j$

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[1]U.S. Department of Health, Education, and Welfare, Office of Education, Higher Education Finances, U.S. Government Printing Office, Washington, D.C. 1968.

APPENDIX III

Survey Forms

The three survey instruments used to collect the data used in this study follow:

1. Financial Statistics of Institutions of Higher Education Fiscal Year ended . . . 1964
2. Faculty and Other Professional Staff: Fall Term 1963-4[1]
3. Resident and Extension Enrollment--Fall 1964[1]

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[1]Included on the form are the totals for the survey year.

OE-2000 (Rev. 7-64)

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
OFFICE OF EDUCATION
WASHINGTON, D.C. 20202

Budget Bureau No. 51R-238.7.
Approval expires 2-15-66.

FINANCIAL STATISTICS OF INSTITUTIONS OF HIGHER EDUCATION

Report for Fiscal Year Ended ..... (Month) **1964**

If your institution has NO branches, check here ☐
This report INCLUDES branches as follows:

COMPTROLLER OR BUSINESS OFFICER

This report EXCLUDES branches as follows:
(Submit separate reports for branches excluded)

THE TERM *"Manual"* refers to *College and University Business Administration*, Volume I, published by the American Council on Education, 1785 Massachusetts Avenue NW., Washington, D.C., 20036.

EXCLUDE "agency funds"—i.e., funds handled by the institution in a custodial capacity only (e.g., funds for student organizations).

In order to avoid accidental omissions, please put a ZERO or DASH in blanks where there is nothing to report.

SCHEDULE I.—CURRENT-FUND INCOME

CURRENT-FUND INCOME includes all income which is expendable for the current operations of the institution. It does NOT include receipts to be added to plant funds, to endowment funds, to student loan funds, or to annuity and living trust funds; report additions to these funds in Schedules III and IV.

A. INCOME FOR EDUCATIONAL AND GENERAL PURPOSES: *(Omit cents)*

1. **Tuition and fees.** Include tuition and general and specific fees assessed against students for educational and general purposes, after deducting all refunds. Include tuition and fees collectible by the institution from all sources—from students, from the Federal Government, from States (under an interstate compact), etc. Include receipts from regular session, from summer session(s), from extension (except instruction abroad), from adult education, and from instruction by mail, radio, or TV. Divide flat-rate charges (such as a *single total charge* for tuition, room, board, plant expansion, etc.) among appropriate items (1, 15*a*, 15*b*, 16, 47*d*, 73*f*), making estimates if amounts not available.

   Remissions or exemptions of tuition and fees, in the form of scholarships and fellowships, should be *counted as income*, even though there is no actual interchange of cash between the institution and the students. (The amounts thus granted should also be included as an expenditure, under G.) (*Manual*, p. 66.)

   If students are accepted from a school district or other public body which pays tuition from public funds, the amount derived from this source should be included both here and in item 4 (deduction); and also in item 7 (if from a State) or in item 8 (if from local governments).

   Do not include tuition and fees for nursery, demonstration, or laboratory schools (put in item 11*c*); nor fees for room and board (item 15); nor fees for intercollegiate athletics, student union, student hospital, etc. (item 16). Also *omit deposits.*

   Student fees sent to a State or denominational headquarters and reappropriated by it to your institution should be treated as fees from students and NOT as income from a State government (item 7), nor as private gifts and grants (item 10).

   Total tuition and fees as defined above ..... $_____

2. **Deduction** of fees (*if included in item 1 above*) which are restricted to use for plant expansion or debt retirement (report in 47*d*), or for student-loan funds (report in 73*f*) ..... $_____

3. **Tuition and fees for educational and general purposes** (item 1 less item 2) ..... $_____

4. **Deduction** of tuition and fees received *directly* from governmental sources (tuition and fees as may be included as parts of items 6*d*, 7 and 8) ..... $_____

5. **Tuition and fees for educational and general purposes,** received from students (item 3 less item 4) ..... $_____

6. **From Federal Government**

   a. Regular appropriations to land-grant institutions for instructions, facilities, research (experiment stations), and cooperative extension. (Only *land-grant institutions* should report this item) ..... $_____

   b. Federal grants or contractual payments for research. Include income both for "unclassified" (nonsecurity) and "classified" research, conducted either on campus or in off-campus research centers. *Do not include* amounts already reported under item *a* ..... $_____

   c. All other Federal grants or payments. Include Federal payments for maintenance of records on students under Public Law 550; and tuition and other costs paid by the Federal Government for training programs for students, such as from the Army and Navy and Veterans Administration. *Exclude* any Federal aid received through State channels (include under item 7). *Exclude* income from Federal land grants (include under item 9). *Exclude* value of surplus materials (include as an addition to plant value in Schedule III, item 57) ..... $_____

   d. TOTAL (sum of items *a*–*c*) ..... $_____

7. **From State government**

   a. Federal funds received through State channels (exclude land-grant funds which are to be reported in item 6*a*) ..... $_____

   b. State appropriations and receipts under a regional (interstate) compact. Also include Federal aid received through State channels which cannot be reasonably identified as to amount. Institutions receiving a biennial appropriation from the State should include only that portion of the appropriation applicable to the fiscal year being reported ..... $_____

   c. TOTAL (sum of items *a* and *b*) ..... $_____

8. **From local governments** (cities, counties, or school districts). Include all income for educational and general purposes received directly from local governments (e.g., tuition and fees for junior college students ..... $_____

9. **Endowment earnings** applicable to current educational and general expenditures (items 24–31). Include general and restricted endowment earnings expendable for items 24–31. Include earnings from endowment funds held in trust outside the institution (by the State or by a private agency). Include earnings from Federal and State land-grant funds. Include transfers to current funds from a reserve for stabilization of endowment. *Exclude* endowment earnings which are added to the principal of the endowment funds or are transferred to plant funds. *Exclude* endowment earnings restricted to Student Aid (item 18). (Please explain briefly if endowment income reported here does not stand in reasonable relation to value of the endowment fund reported in items 72 and 75, page 6.) ..... $_____

10. **Private gifts and grants** expendable for current educational and general purposes (items 24–31). Include income from grants or contracts for research from nongovernmental sources. *Do not include* additions to plant funds, endowment funds, loan funds, etc. (report such additions in Schedules III and IV only). Include both restricted and unrestricted gifts and grants.

    If exact data are not available for reporting in categories *a*–*g* following, please *estimate* the amount in each category. (*Continued on next page.*)

PAGE 2

Private gifts and grants, continued

a. Alumni (individually or through alumni association) ..... $

b. Nonsalaried or contributed services (estimated monetary value) ..... $

c. Churches (denominations, congregations, orders) ..... $

d. Corporations, business concerns ..... $

e. Foundations ..... $

f. Individuals, nonalumni ..... $

g. Other sources ..... $

h. TOTAL PRIVATE GIFTS AND GRANTS (sum of items *a*–*g* above) ..... $

i. Of the total private gifts and grants above, what amount was designated by donors for *organized research*? ..... $

j. Of the total private gifts and grants above, what amount was received through *bequests* (willed)? ..... $

11. From organized activities relating to educational departments. Report the *GROSS* income of all enterprises organized and operated in connection with educational departments and conducted primarily for the purpose of giving professional training to students. Examples of such activities are agricultural college creameries, medical-school hospitals, home-economics cafeterias, laboratory or demonstration schools, materials-testing laboratories, etc. (*Manual*, p. 67–F.) Here may also be included the receipts from "other activities of a general educational and cultural nature," such as concerts, dramatic productions, and artists' series. (*Manual*, p. 68.)

a. Agricultural. (Include receipts from creamery, farms, orchards, etc., when these sources of income are classified as organized activities relating to educational departments.) ..... $

b. Medical. (Include receipts from medical-school hospitals and from medical, dental, and optometric clinics considered as organized activities relating to educational departments.) ..... $

c. All other receipts from organized activities relating to educational departments (e.g., tuition from pupils in laboratory school; fees charged to outside concerns for testing of materials by engineering school, where this service is on a systematic, organized basis; receipts from concert series; etc:) ..... $

d. TOTAL (sum of items *a*–*c*) ..... $

12. Sales and services of educational departments. Include incidental income of educational departments from sales and services. The income from such transactions is, in most instances, irregular, or small as compared to total educational and general income. *Do not include here* amounts already reported in item 11 above. (*Manual*, p. 67–E.)

a. Sales and services of agricultural departments (instruction, extension, research)—e.g., sale of occasional publications, sale of produce of agricultural experiment station, etc ..... $

b. Sales and services of all other educational departments ..... $

c. TOTAL (sum of *a* and *b*) ..... $

13. Other sources. Include interest on investment of current funds (but not of plant funds, endowment funds, etc.); rental of buildings; library fines; etc. *Do not include:* (*a*) rental of student or faculty housing operated as Auxiliary Enterprises (put in items 15–16 below); (*b*) rental of property held as investment of endowment (report in item 9 above—or, if income is added to principal, in Schedule IV, item 73*d*); (*c*) receipts from bond issues or borrowing on plant (report in item 49). *Do not include* interfund transfers or loans [all entries in Schedule I (except item 21) should represent revenue receipts, i.e., a true increase of institutional assets, rather than transfers, exchanges, or loans] .. $

14. TOTAL CURRENT INCOME FOR EDUCATIONAL AND GENERAL PURPOSES (sum of items 5–13) ..... $

B. GROSS INCOME OF AUXILIARY ENTERPRISES. (Include amounts even if funds are not handled by college finance officer.)

15*a*. Cafeterias and dining halls ..... $

15*b*. Student residence halls (excluding amounts reported in 15*a*) ..... $

16. Other auxiliary enterprises [college bookstores, student unions, student hospitals, faculty housing, intercollegiate athletics, concerts, industrial plants operated on a student self-help basis (not part of endowment), university presses (not part of endowment), etc.] ..... $

17. TOTAL GROSS INCOME OF AUXILIARY ENTERPRISES (items 15–16) ..... $

C. STUDENT-AID INCOME FOR SCHOLARSHIPS, FELLOWSHIPS, AND PRIZES. (*Exclude* funds for "teaching fellowships" and "service scholarships," since these represent, primarily, compensation for services.)

18. From restricted endowment funds designated for scholarships, fellowships, and prizes ..... $

19. From restricted private gifts and grants (*do not include* transfers from income already reported in item 10; see item 21 below) ..... $

20. From public sources (*do not include* transfers from income already reported in items 6, 7, or 8; see item 21 below) ..... $

21. Transfers from other income-accounts or funds (e.g., from educational and general income, from annuity funds, etc.). Include also amounts not actually transferred to "Student-Aid Income," but expended directly (for scholarships and fellowships) from unrestricted current funds. *Include remission of tuition and fees* ..... $

22. TOTAL RECEIPTS FOR SCHOLARSHIPS, FELLOWSHIPS, AND PRIZES (sum of items 18–21) ..... $

23. TOTAL, EXCLUDING TRANSFERS AND REMISSIONS (sum of items 18, 19, and 20 only) .... $

D. TOTAL CURRENT-FUND INCOME (sum of items 14, 17, and 23) ..... $

SCHEDULE II.—CURRENT-FUND EXPENDITURES

NOTE 1.—It is desirable to *prorate* salaries of persons employed in more than one category.

NOTE 2.—Include and distribute among items 24–34, as appropriate, the value of *nonsalaried or contributed services* reported in item 10*b* of Schedule I.

NOTE 3.—Report only expenditures made directly from *current funds*, as distinguished from plant funds (Schedule III) and from endowment, loan, and annuity funds (Schedule IV). The figure for "Total Current Expenditures" (item H, page 3) should NOT include transfers or loans from current funds. (Transfers from current to plant funds should be reported in item 48*a*; and other transfers from current funds, in items 21 and 73*g*. Loans from current funds to plant funds should be included in item 49.)

E. EDUCATIONAL AND GENERAL EXPENDITURES:

24. General administration and general expense ..... $

Include all expenditures of the general executive and administrative offices serving the institution as a whole, and expenditures which are of a general character not related to any specific division of the institution—not including, however, the expenditures for Libraries (item 27) nor for Operation and Maintenance of the Physical Plant (item 28). Include expenditures for student personnel services (as defined in *a*, below). (*Manual*, pp. 70–72.)

Administrative expenditures appropriately chargeable directly to Auxiliary Enterprises (items 33–34) or to Organized Activities Relating to Educational Departments (item 30) should *not* be reported here, but should be included with the expenditures of the appropriate activity. (*Manual*, p. 71.)

a. Of the total expenditures in item 24, how much was for *student personnel services? Include all of the following:* Admissions, counseling and guidance programs, administrative cost of financial aids, health services (where not an auxiliary enterprise intended to be self-supporting), offices of student personnel deans, placement, registration and student activities. *Do not include* student housing expenditures for auxiliary enterprises; report these in items 33 and 34. (*Manual*, p. 71.) ..... $

Go on to PAGE 3

In closing this study, the researcher is convinced that the economic problems of higher education are not as diverse nor are the answers unobtainable, as many would have us believe. There are unsolved problems to be sure, but they are more common among institutions than not.

Today more than ever before, and to no small measure the result of student pressure, previously closed minds appear to be open to new and more effective ways of improving the quality of the educational experience. This offers administrators, researchers, and others an unmatched opportunity in uncovering and effecting new ways of obtaining, offering, and utilizing educational resources.

APPENDIX I

A BRIEF REVIEW OF THE LITERATURE AS IT RELATES TO RESEARCH IN ECONOMICS OF EDUCATION[1]

Although many recent studies in the finance of higher education address pertinent issues, they contain little analytical material. For this reason their value is quite limited. Institutional cost studies, such as The Sixty College Study . . . A Second Look (55), the more recent Bundy Study of New York State's private colleges (42), and others (38) are good examples. In each, data is well presented in descriptive form, but little attempt is made to explain analytically institutional differences in funding patterns.

In recent years economists have turned their attention to the broad area of the allocation of resources in higher education. Studies in this area, generally grouped under the banner of economics of higher education, fall into four general categories. The largest effort to date is that which has been devoted to study the role of higher education in economic growth. Becker (13), Correa (19), and

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[1]Numbers in parenthesis refer to Selected Bibliography for the Economics of Higher Education and Related Subjects.

Schultz (50), among others, have published on this issue. Harris (30) and Muskin (39) have dealt in their work with the economic needs and resources of the higher education sector in general. A theory of the economics of education forms the structure of work by Andre Daniere (14). Another category, the one into which this paper might be considered to fall, considers the educational unit as an economic institution and is followed by Southwick (53), Seigel (51), and Jenny (28), among others (25). Discussions of these three works follow.

Southwick uses units of undergraduate and graduate education and research as outputs, and capital, administrative staff, library staff, senior teaching staff, junior teaching staff, and research staff as inputs. His optimization technique is mathematically acceptable. A major limitation of his work, however, is the absence of adjustments for organizational differences and productivity which are necessary for effective inter-institutional comparisons.[1] Southwick

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[1]One important measure of productivity may be thought of as the degree of change in the student's state of knowledge from the beginning to the end of his college experience. One of the more noteworthy studies in this area is Astin's work for the National Merit Scholarship Corporation and the American Council on Education (3, 7, and 10). However, an easily applied universal measure of productivity is not yet available for use in economic or cost-benefit analysis. Joseph A. Kershaw summarizes the issue:

> Most studies of the economics of education devote a few pages to productivity, but I have found in them no really pungent analysis, only a lament that productivity should be higher and that output is hard to define . . . The simple fact is that there is no consensus on what the output of education is or should be: and until we define output we can never know whether we are combining our resource inputs in an optimum way (30, p.185).

did attempt, using empirical data, to correlate his findings with Cartter's (16) subjective evaluation of graduate schools. However, except for research outputs, for which a measure in dollars may be set, no significant correlation existed for the costs of graduate and undergraduate outputs.

Papers by Seigel and Jenny have attempted to avoid the issue of productivity by considering the educational institution as an impressario (or broker). They suggest that institutions of higher education gather resources and, in turn, offer a service, an educational experience, to the students. Their output measure is not a graduate, but rather a student study unit or station.

Barry Seigel attempts to develop an economic theory for the institution of higher education, from which it might be possible to extract a theory of enrollment supply through a theory of choice. He assumes that an IHE is dominated by an institutional utility function and that subject to certain constraints the IHE attempts to maximize its utility. His formulation suggests that enrollment is a function of tuition while revenue is a function of tuition and enrollment plus a constant: grants, subsidies, and endowment income. The output or production function is related to faculty wages and non-instructional outlays: administration, libraries, equipment, capital costs, maintenance, etc. The institution's utility function is determined by outlays of funds and enrollment. Seigel also reviews the effect of scholarship and institutional aid upon enrollment demand.

APPENDIX A

SURVEY OF OPENING FALL ENROLLMENT: 1964

Note: Please report data as soon as enrollment becomes stabilized, preferably within 2 weeks after the opening of the term.

1. In item 1 report the number of full-time and part-time students whose programs consist wholly or principally of work normally creditable toward a bachelor's or higher degree--either in your own institution, or by transfer (as from a junior college to a 4-year institution). Include "special" and "unclassified" students taking such work, regardless of their intentions concerning a degree. Students to be included may be undergraduate or graduate, resident or extension, studying during the day or evening. Include students in theological curricula even if they receive ecclesiastical recognition (such as ordination) rather than a degree. See exclusions, paragraph 4.

Count as full-time students those carrying at least 75% of a normal student-hour load; for graduate students this means at least 75% of the academic load in course-work or other required activity (such as a thesis) normally recommended for such students.

2. In item 2 report those students already counted in item 1 who are first-time students, i.e., students not previously enrolled for work creditable toward a bachelor's degree, either in your institution or in any institution of higher education. Exclude other freshmen; use estimates if exact data are unavailable.

3. In item 3 report students in 1-, 2-, or 3-year undergraduate programs designed to prepare for immediate employment or to provide general education not chiefly transferable to baccalaureate programs in liberal arts or pre-professional education. Report such students only in this item, not in item 1. Exclude adult education enrollments.

4. DO NOT INCLUDE IN THIS REPORT: (a) students in *adult education courses;* (b) students taking courses at home by *mail, radio, or TV;* (c) students enrolled for *individual lessons only* (as in art, music, speech, etc.); (d) students enrolled only for *"short courses"*; (e) *auditors;* (f) students at any branch campus or extension center in a *foreign country.*

5. If exact data are lacking for a group that should be included (e.g., extension students taking bachelor's degree-credit work), include an estimate for the group. If you cannot do this, note the omission in the upper right corner of the report-form.

6. Check to make sure that individual entries add to totals. Also, please verify that the numbers shown in item 2 for first-time students are less than those shown in item 1c. The reverse side of this card is for your files.

7. Please complete the form below, and detach and mail it as promptly as possible. No postage is required.

DEPARTMENT OF HEALTH, EDUCATION, & WELFARE OFFICE OF EDUCATION
SURVEY OF OPENING FALL ENROLLMENT: 1964

RESIDENT AND EXTENSION STUDENTS	MEN	WOMEN	TOTAL
1. Students taking work normally creditable toward a bachelor's or higher degree: a. Full-time	2,121,319	1,320,495	3,441,814
b. Part-time	930,442	615,611	1,546,053
c. TOTAL (A + B)	3,051,761	1,936,106	4,987,867
2. First-time students, included in item 1 above (beginning freshmen with no prior credits applicable toward a bachelor's degree)	706,466	528,340	1,234,806
3. Students in occupational or general studies programs not chiefly creditable toward a bachelor's degree	216,427	116,000	332,427

Name any student groups which you could not include in items 1 and 2 (see instruction 5):

Please compare items 1 and 2 with the data you reported last fall. Note below the reasons for any large increases or decreases:

OE 2026 (REV. 7-64)

The Registrar

Aggregate United States
2,183 institutions

If your institution has *no* branches, check here ☐
This report *includes* branches located at:

This report *excludes* branches located at:

NAME AND TITLE OF REPORTING OFFICER | TELEPHONE NO. & EXT. | DATE

BUDGET BUREAU NO. 51-R162.15 APPROVAL EXPIRES 12/31/64

SELECTED BIBLIOGRAPHY FOR THE ECONOMICS OF
HIGHER EDUCATION AND RELATED SUBJECTS

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